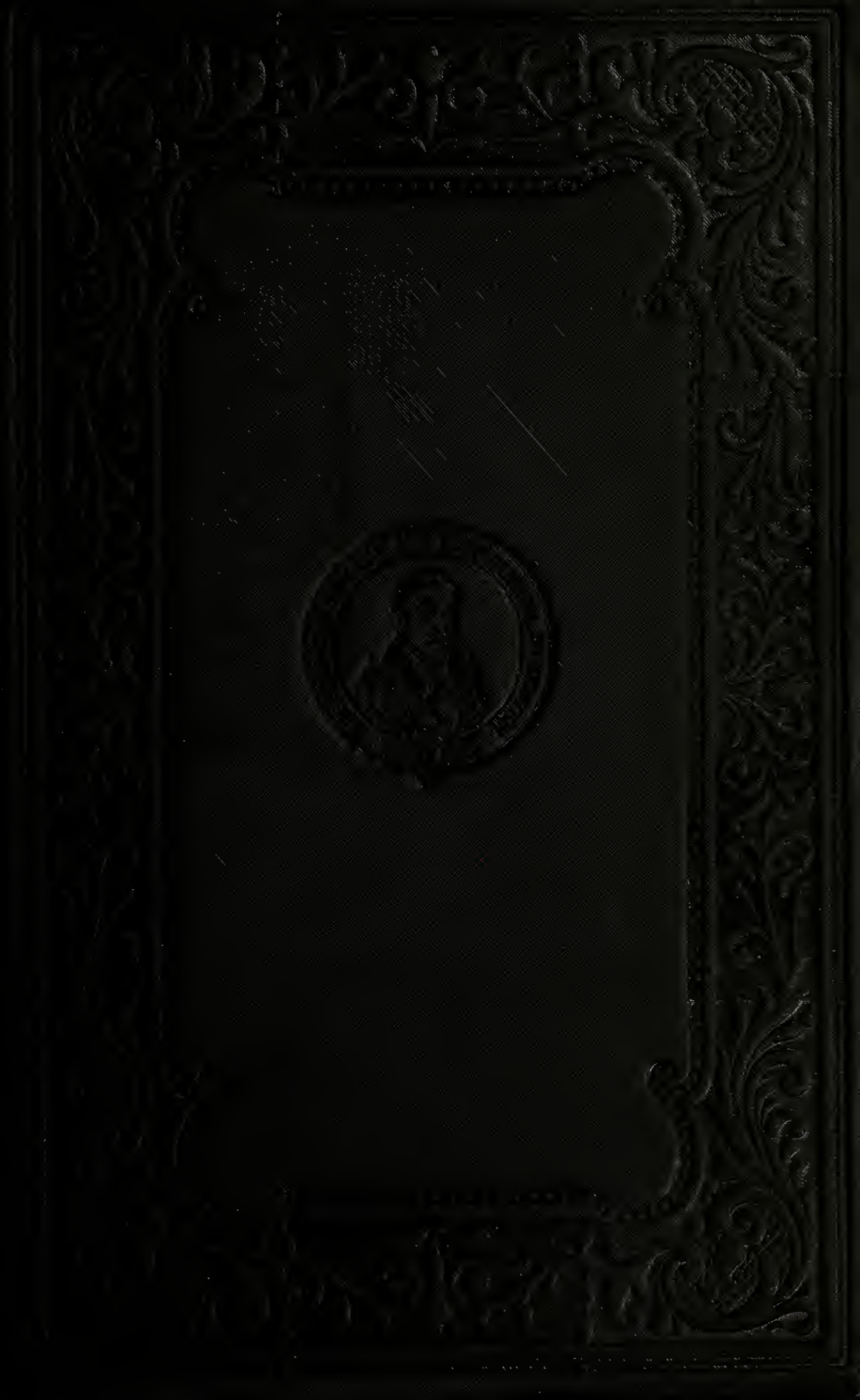

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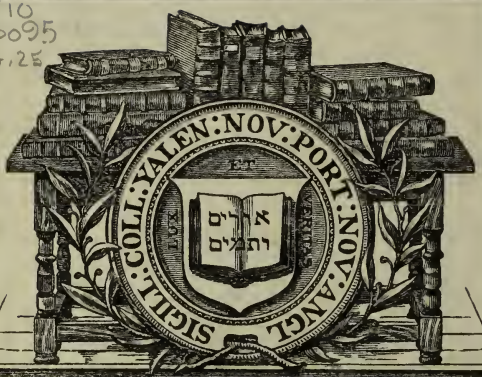

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SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION

VOLUME XXV

TWENTY-FIFTH SESSION

HELD AT OLD POINT COMFORT, VIRGINIA

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1913

The Association does not hold itself responsible for the views enunciated in the papers and discussions published in this volume.

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1911.—Allen, Carroll W., M.D. 1526 Carondelet St., New Orleans, La.

1905.—Baker, James Norment, M.D. Visiting Surgeon, St. Margaret's Hospital; Secretary of the Medical Association of the State of Alabama. 719 Madison Avenue, Montgomery, Ala.

1894.—Baldridge, Felix E., M.D. Huntsville, Ala.

1900.—Baldy, John Montgomery, M.D. Professor of Gynecology, Philadelphia Polyclinic; Surgeon to Gynecean Hospital; Consulting Surgeon to Frederick Douglass Free Hospital and to the Jewish Hospital. 2219 De Lancey Place, Philadelphia, Pa.

1903.—Balloch, Edward A., M.D. Professor of Surgery, Medical Department of Howard University; Surgeon to Freedmen's Hospital; Member American Academy of Medicine. 1511 Rhode Island Avenue, N. W., Washington, D. C.

1908.—Barr, Richard Alexander, M.D. Professor of Surgery and Clinical Surgery, Medical Department of Vanderbilt University; late Major of First Tennessee Infantry, U. S. A. First National Bank Building, Nashville, Tenn.

1905.—Barrow, David, M.D. Ex-President Kentucky State Medical Society. 148 Market Street, Lexington, Ky.

1905.—Bartlett, Willard, M.D. Surgeon to St. Anthony's Hospital. 4257 Washington Boulevard, St. Louis, Mo.

1901.—Baughman, Greer, M.D. Lecturer on Hygiene; Demonstrator of Pathology; Demonstrator of Physiology; in charge of Gynecological Dispensary at Medical College of Virginia. 26 North Laurel Street, Richmond, Virginia.

1907.—Bevan, Arthur Dean, M.D. Professor of Surgery, Rush Medical College, University of Chicago. 100 State Street, Chicago, Ill.

1908.—Blair, Vilray Papin, A.M., M.D. Metropolitan Building, St. Louis, Mo.

1906.—Bloodgood, Joseph Colt, M.D. Associate Professor of Surgery, Johns Hopkins University; Associate Surgeon, Johns Hopkins Hospital; Surgeon to the Union Protestant Infirmary; Chief Surgeon to St. Agnes' Hospital. *Vice-President*, 1910. 904 North Charles Street, Baltimore Md.

1893.—Bloom, J. D., M.D. Consulting Surgeon, Touro Infirmary; Lecturer on Diseases of Children, Tulane University. New Orleans, La.

1901.—Boldt, Hermann J., M.D. Gynecologist to Post-Graduate Hospital, St. Mark's Hospital, German Polyclinic; Consulting Gynecologist to the Beth Israel Hospital and to St. Vincent's Hospital; Professor of Gynecology, Post-Graduate Medical School; Member of the Gynecological Society of Germany; Fellow of the American Gynecological Society; Fellow of the Royal Society of Medicine (London); ex-President of the New York Obstetrical Society; of the German Medical Society of New York; of the Section of Obstetrics of the New York Academy of Medicine. 39 East Sixty-first Street, New York, N. Y.

1902.—Bonifield, Charles Lybrand, M.D. Professor of Clinical Gynecology, Medical College of Ohio (Medical Department University of Cincinnati); Member American Association of Obstetricians and Gynecologists; ex-President Cincinnati Academy of Medicine; ex-President Cincinnati Obstetrical Society. 409 Broadway, Cincinnati, Ohio.

1911.—Borden, W. C., M.D. Professor of Surgery and Dean, George Washington University; Surgeon-in-Chief to the George Washington University Hospital. Washington, D.C.

1890.—Bosher, Lewis Crenshaw, M.D. Professor of Practice of Surgery and Clinical Surgery in the Medical College of Virginia; Visiting Surgeon to the Memorial Hospital; Member of American Surgical Association; Member of the American Association of Obstetricians and Gynecologists;

Member of Association of American Anatomists; Member of American Urological Association; ex-President of Richmond Academy of Medicine and Surgery. *Vice-President*, 1901; *President*, 1905. 422 East Franklin Street, Richmond, Va.

1895.—Bovée, J. Wesley, M.D. Fellow of American Gynecological Society; President of Washington Obstetrical and Gynecological Society; ex-President Medical and Surgical Society of the District of Columbia; Honorary Fellow Medical Society of Virginia; Professor of Gynecology of George Washington University, Washington, D. C.; Gynecologist to Providence, Columbia, and George Washington University Hospitals; Consulting Physician to St. Ann's Infant Asylum, and Attending Gynecologist to St. Elizabeth's Hospital for the Insane, Washington, D. C. *Vice-President*, 1902; *President*, 1903; Member of *Council*, 1903-1906. The Rochambeau, Washington, D. C.

1905.—Brown, John Young, M.D. Formerly Surgeon-in-Charge, St. Louis City Hospital; President of the American Association of Obstetricians and Gynecologists, 1906. *Vice-President.* Metropolitan Building, St. Louis, Mo.

1908.—Bryan, Robert C., M.D. Professor of Descriptive Anatomy, University of Medicine, Visiting Surgeon to the Virginia Hospital. Fifth and Main Streets, Richmond, Va.

1910.—Bryan, W. A., M.D. Professor of Surgery and Clinical Surgery, Vanderbilt University; Professor of Oral Surgery, Dental Department, Vanderbilt University. 146 Eighth Avenue, N., Nashville, Tenn.

1907.—Burch, Lucius E., M.D. Professor of Gynecology, Vanderbilt University, Medical Department; Gynecologist, Nashville City Hospital; Captain and Surgeon, N. G. S. T. 150 Eighth Avenue, N., Nashville, Tenn.

1899.—Burthe, L., M.D. 124 Baronne Street, New Orleans, La.

1900.—Byford, Henry T., M.D. Professor of Gynecology and Clinical Gynecology, College of Physicians and Surgeons (University of Illinois); Professor of Gynecology, Post-Graduate Medical School of Chicago; Surgeon to Woman's Hospital, etc. 122 Michigan Ave., Chicago, Ill.

1912.—Caldwell, C. E., A.M., M.D. Clinical Professor of Surgery and Associate Professor of Surgical Anatomy in Medical Department, University of Cincinnati; Surgeon to Cincinnati General Hospital. 4 West Seventh Avenue, Cincinnati, Ohio.

1910.—Caldwell, Robert, M.D. Professor of Surgical Anatomy, Vanderbilt University; Ex-President Nashville Academy of Medicine. 315 Jackson Bldg., Nashville, Tenn.

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1907.—Clark, S. M. D., M.D. Associate Professor Gynecology, Tulane Medical Department; Visiting Surgeon, Charity Hospital. 1435 Harmony Street, New Orleans, La.

1893.—Cocram, Henry S., M.D. 108 Baronne Street, New Orleans, La.

1908.—Coffey, Robert C., M.D. Secretary Oregon State Board of Medical Examiners; Councellor Oregon State Medical Association. Portland, Oregon.

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1900.—Deaver, John B., M.D. Surgeon-in-Chief to the German Hospital. 1634 Walnut Street, Philadelphia.

1897.—Dorsett, Walter B., M.D. Professor of Obstetrics and Clinical Gynecology, St. Louis University; Gynecologist to the Missouri Baptist Sanitarium and to Evangelical Deaconess' Hospital. 5070 Washington Boulevard St. Louis, Mo.

1896.—Doughty, W. H., M.D. Professor of Special Surgery and Surgical Pathology, Medical Department, University of Georgia; Chief Surgeon to Charleston and Western Carolina Railroad. 822 Greene Street, Augusta, Ga.

1890.—Earnest, John G., M.D. Professor of Clinical Gynecology, College of Physicians and Surgeons; formerly Professor of Gynecology, Southern Medical College; Visiting Gynecologist to the Grady Hospital. 828 Candler Building, Atlanta, Ga.

1907.—Elbrecht, Oscar Herman, M.D. Superintendent and Surgeon-in-Charge of St. Louis Female Hospital; Vice-President, St. Louis Obstetrical and Gynecological Society; Visiting Surgeon on City Hospital Staff. Metropolitan Building, St. Louis, Mo.

1891.—Elkin, William Simpson, M.D. Professor of Operative and Clinical Surgery, Atlanta College of Physicians and Surgeons; ex-President of the Atlanta Society of Medicine; Surgeon to Grady Hospital. 27 Luckie Street, Atlanta, Ga.

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1902.—Freiberg, Albert H., M.D. Professor of Orthopedic Surgery in the Medical College of Ohio, Medical Department of the University of Cincinnati; Orthopedic Surgeon to the Cincinnati Hospital and to the Jewish Hospital of Cincinnati. 19 West Seventh Street, Cincinnati, Ohio.

1895.—Fry, Henry D., M.D. Professor of Obstetrics, Georgetown University; *Vice-President.* 1601 Connecticut Avenue, N. W., Washington, D. C.

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1900.—Goldsmith, W. S., M.D. *Treasurer.* 262 Jackson Street, Atlanta, Ga.

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1896.—Haggard, William David, M.D. Professor of Surgery and Clinical Surgery, Vanderbilt University. *Treasurer*, 1900; *Secretary.* 148 Eighth Avenue, N., Nashville, Tenn.

1910.—Hagner, Francis Randall, M.D. Professor of Genito-urinary Surgery, George Washington University; Attending Genito-urinary Surgeon, George Washington University Hospital; Attending Surgeon, Garfield Memorial Hospital. The Farragut, Washington, D. C.

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1905.—Hendon, George A., M.D. Professor of Surgery and Clinical Surgery, University of Louisville. 968 Baxter Avenue, Louisville, Ky.

1889.—Hill, Robert Somerville, M.D. Gynecologist to the Laurel Hill Hospital; Senior Councillor of the Medical Association of the State of Alabama; ex-President of the Montgomery County Medical and Surgical Association; former Surgeon of the Second Regiment, Alabama State Militia. Montgomery, Ala.

1902.—Hirst, Barton Cooke, M.D. Professor of Obstetrics, University of Pennsylvania; Fellow of College of Physicians, Philadelphia; Gynecologist to the Howard, Orthopedic, and Philadelphia Hospitals; Fellow of American Gynecological Society. 1821 Spruce Street, Philadelphia, Pa.

1911.—Hogan, Edgar P., M.D. 800 South Twentieth St., Birmingham, Ala.

1906.—Holden, Gerry R., M.D. Formerly House Surgeon, Roosevelt Hospital, New York City; formerly Resident Gynecologist, Johns Hopkins Hospital, and Assistant in Gynecology, Johns Hopkins Medical School. 223 West Forsyth Street, Jacksonville, Fla.

1891.—Holmes, J. B. S., M.D. Ex-President of the Tri-State Medical Society of Alabama, Georgia, and Tennessee, ex-President of the Georgia Medical Association; Fellow of the American Association of Obstetricians and Gynecologists. *Vice-President*, 1894. Tampa Bay Hotel Park, Tampa, Fla.

1900.—Horsley, John Shelton, M.D. Professor of Principles of Surgery and Clinical Surgery, Medical College of Virginia; Surgeon to Memorial Hospital. *Vice-President*, 1904. 617 West Grace Street, Richmond, Va.

1896.—Hundley, J. Mason, M.D. Associate Professor of Diseases of Women and Children, University of Maryland; President Clinical Society of Baltimore. 1009 Cathedral Street, Baltimore, Md.

1903.—Hunner, Guy Le Roy, M.D. Associate in Gynecology, Johns Hopkins University; Professor of Genito-Urinary Surgery, Woman's Medical College of Baltimore; Gynecologist-in-Chief, St. Agnes' Hospital; Visiting Gynecologist, Church Home and Hebrew Hospital, Baltimore, Frederick City Hospital, Frederick, Md., and Hagerstown

Hospital, Hagerstown, Md.; Consulting Gynecologist, Brattleboro Memorial Hospital, Brattleboro, Vt. *Vice-President*, 1911. 2305 St. Paul Street, Baltimore, Maryland.

1900.—Ill, Edward Joseph, M.D. Surgeon to the Woman's Hospital; Medical Director, St. Michael's Hospital Gynecologist and Supervising Obstetrician, St. Barnabas' Hospital; Consulting Gynecologist to German Hospital and Beth Israel Hospital of Newark, N. J.; to All Souls' Hospital, Morristown, N. J., and to Mountain Side Hospital, Montclair N. J.; Vice-President from New Jersey to Pan-American Congress of 1893. 1002 Broad Street, Newark, N. J.

1908.—Irvin, James S., M.D. Danville, Va.

1912.—Jackson, William R., M.D. Professor of Surgery to the Medical Department of the University of Alabama; Consulting Surgeon to the City Hospital and Southern Infirmary, Mobile, Ala. 164 St. Michael Street, Mobile, Ala.

1889.—Johnson, Joseph Taber, M.D. Professor of Gynecology and Abdominal Surgery, Georgetown University; formerly Gynecologist to Providence Hospital; Chief of Service of Gynecology and Abdominal Surgery, Georgetown University Hospital, and President of the Board of Administration; President of the Woman's Dispensary, and of the Medical Society of the District of Columbia (1887); Member of the British Medical Association; Fellow of the Gynecological Society; President of the Washington Obstetrical and Gynecological Society; Secretary American Gynecological Society, 1886-1890, and President, 1899. *President*, 1899. 926 Farragut Square, Washington, D. C.

Founder.—Johnston, George Ben, M.D. Formerly Consulting Surgeon to the Richmond Eye, Ear, and Throat Infirmary; ex-President of the Richmond Academy of Medicine and Surgery; ex-President of the Medical Society of Virginia; Member of the American Association of Obstetricians and Gynecologists, and First Vice-President, 1896; Member of the Ninth International Medical Congress; Member of the American Surgical Association; Professor of the Practice of Surgery and Clinical Surgery in the Medical College of Virginia, and formerly Professor of Anatomy; Surgeon to the Old Dominion Hospital; Consulting Surgeon to the City Free Dispensary. *Vice-President*, 1892; *President*, 1897. 407 East Grace Street, Richmond, Va.

1908.—Jonas, Ernst, M.D. Clinical Professor of Surgery, Medical Department, Washington University; Chief of Surgical Clinic, Washington University Hospital; Gynecologist to the Jewish Hospital; Surgeon to the Martha Parsons Hospital for Children; Fellow of the American Association of Obstetricians and Gynecologists. 4495 Westminster Place, St. Louis, Mo.

1910.—Jones, Edward Groves, A.B., M.D. Professor of Surgery, Atlanta School of Medicine; Surgeon to Tabernacle Infirmary; Gynecologist to Wesley Memorial Hospital. Fourth National Bank Building, Atlanta, Ga.

1902.—Jordan, William Mudd, M.D. Surgeon to St. Vincent's Hospital; Gynecologist to Hillman Hospital; formerly Assistant Surgeon, U. S. Marine Hospital Service. Birmingham, Ala.

1912.—Judd, Edward Starr, M.D. Surgeon to St. Mary's Hospital, Rochester, Minn.

1890.—Kelly, Howard Atwood, M.D. Founder of Kensington Hospital, Philadelphia; Associate Professor of Obstetrics, University of Pennsylvania, 1888-89; Professor of Gynecology and Obstetrics, Johns Hopkins University, 1888-99; Professor of Gynecology, Johns Hopkins University; Gynecologist-in-Chief to Johns Hopkins Hospital; Member Associé Etranger de la Société Obstétricale et Gynécologique de Paris; Correspondirendes Mitglied der Gesellschaft f. Geburtshülfe zu Leipzig; Honorary Fellow Edinburgh Obstetrical Society, Royal Academy of Medicine (Ireland), and British Gynecological Society; Member Washington Academy of Sciences; Fellow of the American Gynecological Society. *President*, 1907. 1418 Eutaw Place, Baltimore, Maryland.

1907.—Kirchner, Walter C. G., M.D. Formerly Surgeon-in-Charge, St. Louis City Hospital. 508 Metropolitan Building, St. Louis, Mo.

1899.—Kohlman, William, M.D. 3500 Prytania Street New Orleans, La.

1894.—Leigh, Southgate, M.D. Visiting Surgeon to St. Vincent's and Norfolk Protestant Hospitals; First Vice-President Medical Society of Virginia, 1899-1900. 147 Granby Street, Norfolk.

1912.—Lewis, Bransford, M.D. Century Building, St. Louis, Mo.

1893.—Lewis, Ernest S., M.D. Professor of Gynecology, Medical Department of Tulane University. *Vice-President*, 1895; *President*, 1896; *Member of Council*, 1896-1903. 124 Baronne Street, New Orleans, La.

1900.—Lloyd, Samuel, M.D. Professor of Surgery, New York Post-Graduate Medical School; Attending Surgeon to the Post-Graduate Hospital and St. Francis' Hospital, and Consulting Surgeon to the Benedictine Sanitarium at Kingston, N. Y. 12 West Fiftieth Street, New York, N. Y.

Founder.—Long, John Wesley, M.D. Emeritus Professor of Gynecology and Pediatrics in the Medical College of Virginia; formerly Gynecologist to the Old Dominion Hospital and the Richmond City Dispensary; Member, ex-Orator, and ex-Vice-President of the North Carolina Medical Society. *Vice-President*, 1902. Greensboro, N. C.

1904.—Lupton, Frank A., M.D. 716 North Eighteenth Street, Birmingham, Ala.

1902.—McAdory, Wellington P., M.D. Surgeon to Hillman Hospital. Birmingham, Ala.

1911.—McGlannan, Alexius, M.D. Associate Professor of Surgery, College of Physicians and Surgeons, Baltimore. 114 West Franklin St., Baltimore, Md.

1895.—McGannon, M. C., M.D. Professor of Surgery and Clinical Surgery, Medical Department, Vanderbilt University; Chief Surgeon, Woman's Hospital. 118 Eighth Avenue, N., Nashville, Tenn.

1893.—McGuire, Stuart, M.D. Professor of the Principles of Surgery and Clinical Surgery, University College of Medicine; Surgeon-in-Charge, St. Luke's Hospital; Visiting Surgeon, Virginia Hospital; Consulting Surgeon, Virginia Home for Incurables. *President*, 1908. 518 East Grace Street, Richmond Va.

1891.—McGuire, W. Edward, M.D. Professor of Gynecology, University College of Medicine; Gynecologist to the Virginia Hospital. 411 East Grace Street, Richmond, Va.

1905.—MacLean, Henry Stuart, M.D. Professor of Pathology, University College of Medicine. 406 West Grace Street, Richmond, Va.

1888.—McMurtry, Lewis S., M.D. Ex-President of the American Medical Association; Professor of Abdominal Surgery and Gynecology in the Medical Department of the Uni-

versity of Louisville; Surgeon to the Louisville City Hospital; Gynecologist to St. Mary and St. Elizabeth Hospital; Gynecologist to Gray Street Infirmary; ex-President of the American Association of Obstetricians and Gynecologists; ex-President of the Kentucky State Medical Society; Corresponding Member of the Gynecological Society of Boston; Fellow of the British Gynecological Society; Ordinary Fellow of the Edinburgh Obstetrical Society; Fellow of the American Surgical Society. *President*, 1891. Suite 610, The Atherton, Fourth and Chestnut Streets, Louisville, Ky.

1888.—McRae, Floyd Willcox, M.D. Professor of Gastro-intestinal, Rectal, and Clinical Surgery, Atlanta College of Physicians and Surgeons; Surgeon to Grady Hospital; ex-President Medical Association of Georgia; ex-Secretary of Section on Surgery and Anatomy, American Medical Association. *Treasurer*, 1901-1903; *President*, 1904. Peters Building, Atlanta, Ga.

1912.—Malone, Battle, M.D. 1701 Exchange Building, Memphis, Tenn.

1891.—Marcy, Henry Orlando, M.D., LL.D. Ex-President of the American Medical Association; President of the Section of Gynecology, Ninth International Medical Congress; late President of the American Academy of Medicine; Corresponding Member of the Medico-Chirurgical Society of Bologna, Italy; Fellow of the American Association of Obstetricians and Gynecologists. 180 Commonwealth Avenue, Boston, Mass.

1899.—Martin, E. Denegre, M.D. Professor of Surgery, Post-graduate Department, Tulane Medical College; Visiting Surgeon to Charity Hospital. 741 Carondelet St., New Orleans, La.

1909.—Martin, Frank, M.D. Clinical Professor of Surgery at the University of Maryland. 1000 Cathedral Street, Baltimore, Md.

1904.—Mason, J. M., M.D. Gynecologist to St. Vincent Hospital. 1915 Sixteenth Avenue, S., Birmingham, Alabama.

1899.—Mastin, William M., M.D. Fellow of the American Surgical Association; Member of the American Association of Genito-urinary Surgeons; Surgeon to the Mobile City Hospital. Joachim and Conti Streets, Mobile, Ala.

1893.—Matas, R., M.D. Professor of Surgery, Medical Department of Tulane University; Fellow of the American Surgical Association. *President*, 1911. 3523 Prytania St., New Orleans, La.

1896.—Matthews, William P., M.D. Professor of Anatomy, Medical College of Virginia; Orthopedic Surgeon to the Old Dominion Hospital. Richmond, Va.

1902.—Mayo, Charles H., M.D. Attending Surgeon, St. Mary's Hospital; Fellow American Surgical Society; ex-President, Western Surgical and Gynecological Association and of Minnesota State Medical Society. Rochester, Minn.

Founder.—Meriwether, Frank T., M.D. Assistant Surgeon, U. S. A. (Retired). Asheville, N. C.

1899.—Michinard, P. E., M.D. 624 Gravier Street, New Orleans, La.

1888.—Miller, C. Jeff., M.D. Visiting Surgeon to Charity Hospital of Louisiana; Professor of Clinical Obstetrics and Clinical Gynecology in the Tulane University of Louisiana; Chief of the Division of Obstetrics, Gynecology and Abdominal Surgery of the Presbyterian Hospital. 1638 Joseph Street, New Orleans, La.

1907.—Mitchell, James F., M.D. Surgeon to Providence Hospital. 1344 Nineteenth Street, Washington, D. C.

1901.—Mixter, Samuel Jason, M.D. Surgeon, Massachusetts General Hospital; Consulting Surgeon, Massachusetts Charity Eye and Ear Infirmary; Instructor of Surgery, Harvard Medical School. 180 Marlborough St., Boston, Mass.

1910.—Moore, James E., M.D. Professor, and Chief of the Department of Surgery in the College of Medicine and Surgery of the University of Minnesota; Fellow and Ex-Vice-President of the American Surgical Association; Member and Ex-President of the Western Surgical Association; Member and Ex-chairman of the Surgical Section of the American Medical Association; Honorary member of the American Orthopedic Association. 704 Pillsbury Building, Minneapolis, Minn.

1911.—Moore, John Thomas, M.D. 612 Gray Avenue, Houston, Texas.

1904.—Moran, John F., M.D. Professor of Obstetrics, Georgetown University; Obstetrician to Georgetown University Hospital and Columbia Hospital for Women. 2426 Pennsylvania Avenue, Washington, D. C.

1902.—Morris, Lewis C., M.D. Professor of Anatomy and Associate Professor of Gynecology, Birmingham Medical College; Councillor of Medical Association, State of Alabama; Vice-President of Tri-State Medical Society of Alabama, Georgia, and Tennessee. *Vice-President.* 716 North Eighteenth Street, Birmingham, Ala.

1900.—Morris, Robert Tuttle, M.D. Professor of Surgery, New York Post-Graduate Medical School and Hospital. 616 Madison Avenue, New York, N. Y.

1901.—Mullally, Lane, M.D. Professor of Obstetrics and Diseases of Children, Medical College, State of South Carolina; Visiting Physician in Obstetrics and Pediatrics, Roper Hospital. Charleston, S. C.

1894.—Murphy, J. B., M.D. Ex-President American Medical Association; Professor of Surgery, Northwestern University; Professor of Surgery, Post-Graduate School and Hospital; Attending Surgeon, Cook County and Mercy Hospitals. 104 South Michigan Avenue, Chicago, Illinois.

1889.—Nicolson, William Perrin, M.D. Professor of Anatomy and Clinical Surgery, Atlanta College of Physicians and Surgeons; Visiting Surgeon to Grady Hospital; Senior Surgeon to Wesley Memorial Hospital; Senior Surgeon, St. Joseph Hospital. *Vice-President,* 1900. Prudential Building, Atlanta, Ga.

1896.—Noble, Charles P., M.D. Surgeon-in-Chief, Kensington Hospital for Women; Consulting Surgeon, Woman's Hospital; Lecturer on Gynecology, Philadelphia Polyclinic. 1500 Locust Street, Philadelphia, Pa.

1890.—Noble, George H., M.D. Dean and Professor of Abdominal Surgery and Clinical Gynecology, Atlanta School of Medicine; Gynecologist of Grady Hospital; Senior Gynecologist, Wesleyan Memorial Hospital, Atlanta; Fellow of the American Gynecological Association and the American Association of Obstetricians and Gynecologists; ex-President of the Medical Association of Georgia; ex-Secretary of the Section of Obstetrics, American Medical Association. *Vice-President,* 1901; *President,* 1905. 131 South Pryor Street, Atlanta, Ga.

1911.—Norris, Henry, M.D. Rutherfordton, North Carolina.

1902.—O'Brien, Matthew Watson, M.D. Surgeon, Southern and Chesapeake and Ohio Railways; Member of the American Association for the Advancement of Science. 908 Cameron Street, Alexandria, Va.

1901.—Ochsner, A. J., M.D. Adjunct Professor of Clinical Surgery, College of Physicians and Surgeons; Surgeon-in-Chief, Augustana and St. Mary's Hospital. 710 Sedgwick Street, Chicago, Ill.

1903.—Ochsner Edward H., M.D. Surgeon to Augustana and St. Mary's Hospital. 710 Sedgwick Street, Chicago, Ill.

1904.—Oechsner, John F., M.D. Professor of Orthopedic Surgery and the Surgery of Children, Post-Graduate Medical Department, Tulane University of Louisiana; Visiting Surgeon, Charity Hospital. Macheca Building, New Orleans, La.

1902.—Oliver, John Chadwick, M.D. Dean and Professor of Operative Surgery, Miami Medical College; Surgeon to the Cincinnati, Christ, and Presbyterian Hospitals. 628 Elm Street, Cincinnati, Ohio.

1888.—Parham, F. W., M.D. Professor of Surgery in the New Orleans Polyclinic. *Vice-President*, 1899; *President*, 1908. 1429 Seventh Street, New Orleans, La.

1900.—Park, Roswell, M.D. Professor of Surgery, Medical Department, University of Buffalo; Surgeon, Buffalo General Hospital; Member of German Congress of Surgeons, Italian Surgical Society, American Surgical Association, American Orthopedic, and American Genito-urinary Associations. 510 Delaware Avenue, Buffalo, N. Y.

1910.—Payne, Robert Lee, Jr., M.D. Assistant Gynecologist to St. Vincent's Hospital; Surgeon to the Southern Railway; Consulting Surgeon to the Seaboard Air Line Railway. 300 Freemason St., Norfolk, Va.

1899.—Perkins, W. M., M.D. Chief of the Clinic Chair of General Clinical and Operative Surgery, New Orleans Polyclinic; Assistant Demonstrator of Operative Surgery, Medical Department, Tulane University of Louisiana; Visiting Surgeon to the Charity Hospital. Macheca Building, 830 Canal Street, New Orleans, La.

1908.—Peterson, Reuben, A.M., M.D. Professor of Obstetrics and Gynecology, University of Michigan; Obstetrician and Gynecologist-in-Chief to the University of Michigan Hospital. Ann Arbor, Mich.

1899.—Platt, Walter Brewster, M.D. Surgeon to the

Robert Garrett Hospital for Children. 802 Cathedral Street, Baltimore, Md.

1889.—Polk, William M., M.D. Dean and Professor of Obstetrics and Gynecology, Cornell University Medical College; Gynecologist to Bellevue Hospital; Consulting Surgeon to St. Luke's, St. Vincent's, New York Lying-in, and Trinity Hospitals; ex-President of American Gynecological Society, and New York Obstetrical Society. 7 East Thirty-sixth Street, New York.

1900.—Porter, Miles F., M.A., M.D. Surgeon to Hope Hospital; Professor of Surgery, Indiana University School of Medicine. Fort Wayne, Ind.

1900.—Ransohoff, Joseph, M.D., F.R.C.S. Professor of Anatomy and Clinical Surgery, University of Cincinnati; Surgeon to Cincinnati, Good Samaritan, and Jewish Hospitals; Member American Surgical Association. 19 West Seventh Street, Cincinnati, Ohio.

1911.—Reder, Francis, M.D. Delmar Building, St. Louis, Mo.

1890.—Reed, Charles Alfred Lee, M.D. Ex-President of the American Medical Association; Professor of Gynecology and Abdominal Surgery in the Cincinnati College of Medicine and Surgery; Surgeon to the Cincinnati Free Hospital for Women; Fellow of the American Association of Obstetricians and Gynecologists; Fellow of the British Gynecological Society; ex-Chairman of the Section on Obstetrics and Diseases of Women of the American Medical Association; Secretary-General of the Pan-American Medical Congress, 1893; Honorary Member of the Medical Society of the State of New York. "The Gaston," Cincinnati, Ohio.

1900.—Rees, Charles M., M.D. 98 Wentworth St., Charleston, S. C.

1912.—Richardson, Edward P., M.D. Surgeon to Outpatients, Massachusetts General Hospital, and Surgeon to the Robert B. Brigham Hospital for Chronic Diseases. 224 Beacon Street, Boston, Mass.

1888.—Roberts, William O., M.D. Professor of Principles of Surgery and Clinical Surgery, Medical Department of the University of Louisville; formerly Secretary of the Surgical Section of the American Medical Association. *President*, 1910; *Vice-President*, 1889. 1520 Third Street, Louisville, Ky.

1901.—Robins, Charles Russell, M.D. Professor of Gynecology, Medical College of Virginia; Gynecologist to the Memorial Hospital; Surgeon to the Atlantic Coast Railroad. 8 West Grace Street, Richmond, Va.

1889.—Robinson, William Lovaille, M.D. Fellow of the American Association of Obstetricians and Gynecologists; ex-President of the Danville Medical Society; Member of the Medical Examining Board of Virginia; ex-President of Virginia Medical Society. *Vice-President,* 1899. 753 Main Street, Danville, Va.

1906.—Rogers, Carey Pegram, M.D. Chief of Surgical Staff, St. Luke's Hospital; Consulting Surgeon, Sea Board Air Line Railway. 221 Laura Street, Jacksonville, Fla.

1901.—Rogers, Mack, M.D. Professor of Anatomy, Birmingham Medical College. 212 Twentieth Street, Birmingham, Ala.

1901.—Rosser, Charles M., M.D. Professor of Surgery, Baylor University, College of Medicine; Consulting Surgeon, Parkland Hospital; Attending Surgeon, Texas Baptist Memorial Sanitarium; ex-Vice-President Texas State Medical Association; Vice-President, Tri-State Society of Texas, Louisiana and Arkansas. *Treasurer,* 1904–07. 432 Gaston Avenue, Dallas, Texas.

1899.—Royster, Hubert Ashley, A.B., M.D. Surgeon to Rex Hospital; Surgeon-in-Chief, St. Agnes' Hospital; Surgeon to Southern Railway. 423 Fayetteville Street, Raleigh, N. C.

1909.—Ruffin, Kirkland, M.D. Surgeon-in-Charge of St. Christopher's Hospital. 218 York Street, Norfolk, Va.

1901.—Runyan, Joseph P., M.D. 203 West Second Street, Little Rock, Ark.

1908.—Russell, Wm. Wood, M.D. Associate Professor of Gynecology, Johns Hopkins University; Associate in Gynecology, Johns Hopkins Hospital; Gynecologist to Union Protestant Infirmary, Baltimore. Baltimore, Md.

1893.—Saunders, Bacon, M.D. Professor of Surgery and Clinical Surgery and Dean of Faculty of Medical Department, Fort Worth University; ex-President, Texas State Medical Association. *Vice-President,* 1903; *Member of Council,* 1908. Ninth and Houston Streets, Fort Worth, Texas.

1910.—Schachner, August, M.D. 844 Fourth Avenue, Louisville, Ky.

Founder.—Schilling, Nicholas, M.D. Cedar Bayou, Tex.

1907.—Scott, Arthur Carroll, M.D. Senior Surgeon, Temple Sanatorium. Temple, Texas.

1899.—Shands, A. R., M.D. Professor of Orthopedic Surgery in the Medical Department of the George Washington University and in the University of Vermont; Orthopedic Surgeon to the George Washington University Hospital, the Emergency Hospital, and Central Dispensary; Charter Member Washington Academy of Sciences; Member American Orthopedic Association; and Honorary Member of Medical Society of Virginia. 901 Sixteenth Street, N. W., Washington, D. C.

1902.—Sherrill, J. Garland, M.D. Professor of Surgery and Clinical Surgery, University of Louisville; Consulting Surgeon to Louisville Hospital. *Vice-President*, 1911. 633 St. Charles Place, Louisville, Ky.

1900.—Simpson, Frank Farrow, M.D. Assistant Gynecologist to Mercy Hospital; Gynecologist to Out-patient Department, Mercy Hospital. Jenkins Arcade Building, Pittsburgh, Pa.

1899.—Smythe, Frank David, M.D. Gynecologist to St. Joseph's and City Hospitals; Professor of Gynecology, Didactac and Clinical, in the Memphis Hospital Medical College; Ex-President West Tennessee Medical and Surgical Association; formerly Member of the Mississippi State Board of Health and State Board of Medical Examiners of Mississippi. Porter Building, Memphis, Tenn.

1904.—Stokes, James Ernest, M.D. Salisbury, N. C.

Founder.—Stone, Isaac Scott, M.D., ScD. Professor of Gynecology, Georgetown University; Gynecologist to Columbia and Georgetown University Hospitals; Fellow of the American Gynecological Society; Fellow of the Royal Society of Medicine, London, England. *Vice-President*, 1905. 1618 Rhode Island Avenue, N. W., Washington, D. C.

1894.—Talley, Dyer F., M.D. Associate Professor of Surgery, Birmingham Medical College; Attending Surgeon to Hillman Hospital; Surgeon to the Talley and McAdory Infirmary; Ex-President of the Jefferson County Medical Society; Member of the Southern Medical Association; Member of the Pan-American Medical Association; Member of the Alumni Association of the Charity Hospital of Louisiana; Member of the Board of Censors of the Jefferson County

Medical Society; Member of the Alabama State Board of Censors, Committee of Public Health and Examiners; Fellow of the American Association of Obstetricians and Gynecologists. 1801 Seventh Avenue, Birmingham, Ala.

Founder.—Taylor, Hugh M., M.D. Professor of Practice of Surgery and Clinical Surgery, University College of Medicine; Surgeon to the Virginia Hospital; ex-President of the Virginia Board of Medical Examiners. 6 North Fifth Street, Richmond, Va.

1898.—Taylor, William Wood, A.B., M.D. Gynecologist to the Lucy Brinkley and the Memphis City Hospitals. 206 Randolph Building, Memphis, Tenn.

1892.—Thompson, J. E., M.D. Professor of Surgery in the University of Texas. *Vice-President,* 1912. Galveston, Tex.

1890.—Tompkins, Christopher, M.D. Professor of Obstetrics in the Medical College of Virginia. *Vice-President,* 1903. 116 East Franklin Street, Richmond, Va.

1908.—Torrance, Gaston, M.D. Member Surgical Staff, Hillman's Hospital; also the Sisters' Hospital and St. Vincent's; Fellow of the American Association of Obstetricians and Gynecologists. 325 to 328 Woodward Building, Birmingham, Ala.

1909.—Trout, Hugh Henry, M.D. Surgeon-in-Chief of Jefferson Surgical Hospital, Roanoke, Va. 1303 Franklin Road, Roanoke, Va.

1888.—Tuholske, Herman, M.D. Professor of Surgery, Medical Department, Washington University; Consulting Surgeon, St. Louis City Hospital; Surgeon to St. Louis Polyclinic Hospital. 465 North Taylor Street, St. Louis, Missouri.

1912.—Turck, Raymond C., M.D. Consolidated Building, Jacksonville, Fla.

1905.—Vance, Ap Morgan, M.D. Surgeon to St. Mary and Elizabeth Hospital; Consulting Surgeon, Louisville City Hospital. 921 Fourth Street, Louisville, Ky.

1893.—Vander Veer, Albert, M.D. Professor of Clinical, Didactic, and Abdominal Surgery, Albany Medical College; ex-President of the American Surgical Association; ex-President of the American Association of Obstetricians and Gynecologists; ex-President of the Medical Society of the State of New York. 28 Eagle Street, Albany, New York.

1909.—Vaughan, George Tully, M.D. Professor of Surgery and Head of Department of Surgery in Georgetown University; Chief Surgeon in Georgetown University Hospital; Visiting Surgeon to the Emergency Hospital; Consulting Surgeon to the Government Hospital for the Insane. 1718 I Street, Washington, D.C.

1891.—Walker, Edwin, M.D., Ph.D. Gynecologist to the Evansville City Hospital; ex-President Mississippi Valley Medical Association; President of the Indiana State Medical Society; Fellow of the American Association of Obstetricians and Gynecologists. 712 Upper Fourth Street, Evansville, Ind.

1912.—Walker, George, M.D. Associate in Surgery, Johns Hopkins University. 1 E. Centre St., Baltimore, Maryland.

1911.—Waring, T. P., M.D. Savannah, Ga.

1905.—Wathen, John R., A B., M.D. Professor of Principles and Practice of Surgery and Clinical Surgery, University of Louisville; Surgeon to St. Anthony's, Louisville City, and University of Louisville Hospitals. 628 Fourth Avenue, Louisville, Ky.

1898.—Watkins, Isaac Lafayette, M.D. Ex-President of the Montgomery County Medical and Surgical Society. Montgomery, Ala.

1907.—Watts, Stephen H., M.D. Professor of Surgery University of Virginia; Surgeon-in-Chief and Director of the University of Virginia Hospital. University of Virginia, Charlottesville, Va.

1901.—Werder, X. O., M.D. Gynecologist, Mercy Hospital, Pittsburgh: Professor of Gynecology, West Pennsylvania Medical College; Consulting Surgeon to the South Side Hospital, Allegheny General Hospital, St. Francis' Hospital, etc. 524 Pennsylvania Avenue, Pittsburgh, Pa.

1888.—Westmoreland, Willis F., M.D. Professor of Surgery, Atlanta College of Physicians and Surgeons. *Vice President*, 1908. 241 Equitable Building, Atlanta, Ga.

1904.—Whaley, T. P., M.D. Lecturer on Genito-urinary and Renal Surgery, Charleston Medical School; Lecturer on Diseases of Skin, Medical College of State of South Carolina; Surgeon to Sherra's Dispensary; Visiting Surgeon, Charleston City Hospital. 13 Wentworth Street, Charleston, South Carolina.

1900.—Williams, J. Whitridge, A.B., M.D. Professor of Obstetrics, Johns Hopkins University; Obstetrician-in-Chief, Johns Hopkins Hospital; Gynecologist to the Union Protestant Infirmary. 1128 Cathedral Street, Baltimore, Md.

1907.—Willis, A. Murat, M.D. Instructor in Abdominal Surgery, Medical College of Virginia; Junior Surgeon to Memorial Hospital, Richmond, Va. 405 East Grace Street, Richmond, Va.

1905.—Winslow, Randolph, M.D., LL.D. Professor of Surgery, University of Maryland; Chief Surgeon, University Hospital; Consulting Surgeon, Hebrew Hospital, and to Hospital for Crippled Children. 1900 Mt. Royal Terrace, Baltimore, Md.

1905.—Witherspoon, T. Casey, M.D. Formerly Professor of Operative and Clinical Surgery, Medical Department, St. Louis University; Member of American Association of Anatomists. 307 West Granite Street, Butte, Mont.

1900.—Wysor, John C., M.D. Surgeon-in-Charge, Chesapeake and Ohio Hospital. Clifton Forge, Va.

1900.—Young, Hugh H., M.D. Chief of Clinic, Genito-urinary Surgery, Johns Hopkins Hospital. 330 North Charles Street, Baltimore, Md.

1902.—Zinke, E. Gustav, M.D. Professor of Obstetrics and Clinical Gynecology in the Ohio-Miami Medical College, the Medical Department of the Cincinnati University; Obstetrician and Gynecologist to German Protestant Hospital; Attending Obstetrician to Ohio Maternity; ex-President of American Association of Obstetricians and Gynecologists. 4 West Seventh Street, Cincinnati, Ohio.

CONSTITUTION

ARTICLE I

The name of this Association shall be The Southern Surgical and Gynecological Association.

ARTICLE II

The object of this Association is to further the study and practice of surgery and gynecology among the profession of the Southern States.

ARTICLE III

This Association shall adopt and conform to the Code of Ethics of the American Medical Association.

ARTICLE IV

Section 1. Any reputable physician who practises surgery or gynecology, and who is vouched for by two members of the Association and recommended by the Council, shall be eligible to membership in this body.

Sec. 2. The honorary members shall not exceed twenty-five in number, and shall enjoy all the privileges of other members, excepting to vote or hold office, but shall not be required to pay any fee.

ARTICLE V

Section 1. The officers of this Association shall be a President, two Vice-Presidents, a Secretary, a Treasurer, and a Council, elected by ballot.

Sec. 2. The President and Vice-Presidents shall be elected for one year, and the President shall not be eligible for reëlection at any time; the Secretary and Treasurer, each, for five years; and the Council as provided for in the By-laws.

ARTICLE VI

SECTION 1. It shall be the duty of the President to preside at all meetings of the Association; to give the casting vote; to see that the rules of order and decorum be properly enforced in all deliberations of the Association; to sign the approved proceedings of each meeting, and to approve such orders as may be drawn upon the Treasurer for expenditures ordered by the Association.

SEC. 2. In the absence of the President the first Vice-President shall preside, and in his absence the second Vice-President shall preside.

SEC. 3. In the absence of all three, the Association shall elect one of its members to preside *pro tem.*

SEC. 4. It shall be the duty of the Secretary to keep a true and correct record of the proceedings of the meetings; to preserve all books, papers, and articles belonging to the archives of the Association; to attest all orders drawn on the Treasurer for moneys appropriated by the Association; to keep the account of the Association with its members; to keep a register of the members, with the dates of their admission and places of residence. He shall collect all moneys due from the members and pay to the Treasurer, taking his receipt for the same. He shall report such unfinished business of previous meetings as may appear on his books requiring action, and attend to such other business as the Association may direct. He shall also supervise and conduct all the correspondence of the Association, and edit the TRANSACTIONS under the direction of the Council.

SEC. 5. It shall be the duty of the Treasurer to keep a correct record of all moneys received from the hands of the Secretary, giving his receipt for the same; pay them out by order of the Association as indorsed by the President and attested by the seal in the hands of the Secretary.

SEC. 6. It shall be the duty of the President of the Association to appoint an Auditing Committee, consisting of three members of the Association, whose duty it shall be to examine the books of the Secretary and Treasurer, and report on the same on the last day of the session.

ARTICLE VII

Vacancies occurring in the offices of the Association shall be filled by appointment of the President until the next meeting. He shall also have the appointment of all committees not otherwise provided for.

ARTICLE VIII

This Constitution shall take effect immediately from the time of its adoption, and shall not be amended except by a written resolution, which shall lie over one year, and receive a vote of two-thirds of the members present.

ARTICLE IX

The membership of the Association shall be limited to two hundred.

BY-LAWS

ARTICLE I

The Southern Surgical and Gynecological Association shall meet annually on the Tuesday of the week preceding the week in which Christmas occurs, at 10 A.M., at such place as may be designated at the preceding meeting.

ARTICLE II

The members present shall constitute a quorum for business.

ARTICLE III

The annual dues of each member shall be $10, paid in advance.

ARTICLE IV

The usual parliamentary rules governing deliberative bodies shall govern the business workings of this Association.

ARTICLE V

All questions before the Association shall be determined by a majority of the votes present.

ARTICLE VI

The President shall deliver an annual address at each meeting of the Association.

ARTICLE VII

The Secretary of the Association shall receive at each annual Session a draft from the President, drawn on the Treasurer, for the sum of $500, for services rendered the Association, and to this shall be added the necessary expense incurred in the discharge of his official duties.

ARTICLE VIII

It shall be the duty of the Secretary, one month prior to the annual meeting, to notify the members of the Association, and urge their attendance.

ARTICLE IX

The authors of papers shall notify the Secretary, six weeks prior to the meeting, of the titles of their essays, so that they may be incorporated in the preliminary programme.

ARTICLE X

COUNCIL

The Council shall consist of five members; and of those elected at the primary meeting, the first shall serve five years, the second four, the third three, the fourth two, and the fifth one year; so that subsequently one member of the Council shall be elected annually to serve five years. No member of the Council shall be eligible for reëlection. The President and Secretary shall be *ex-officio* members of the Council.

This Council shall organize by electing a Chairman and Secretary, and shall keep a record of its proceedings.

The duties of this Council shall be—

1. To investigate applications for membership and report to the Association the names of such persons as are deemed worthy.

2. To take cognizance of all questions of an ethical, judicial, or personal nature, and upon these the decision of the Council shall be final; *provided*, that appeal may be taken from such decision of the Council to the Association, under a written protest, which protest shall be sustained by the Association, and the matter shall then be referred to a special committee, with power to take final action.

3. All motions and resolutions before the Association shall be referred to the Council without debate, and it shall report by recommendation at as early an hour as possible.

ARTICLE XI

The President shall appoint at each annual meeting a Committee of Arrangements.

ARTICLE XII

The Council shall have full power to omit from the published TRANSACTIONS, in part or in whole, any paper that may be referred to it by the Association, unless specially instructed to the contrary by the Association, which will be determined by vote.

ARTICLE XIII

Any member failing to pay his dues for more than one year shall be dropped.

ARTICLE XIV

No paper shall be read before this Association which does not deal strictly with a subject of surgical or gynecological importance.

ARTICLE XV

No paper read before this Association shall be published in any medical journal or pamphlet for circulation, as having been read before the Association, without having received the indorsement of the Council.

ARTICLE XVI

The reading of papers shall be limited to twenty minutes each, except by permission of the Association.

MINUTES OF THE PROCEEDINGS

AT THE

TWENTY-FIFTH ANNUAL MEETING

OF

THE SOUTHERN

SURGICAL AND GYNECOLOGICAL

ASSOCIATION

HELD AT

HOTEL CHAMBERLIN

Old Point Comfort, Virginia

DECEMBER 17, 18, AND 19, 1912

TWENTY-FIFTH ANNUAL MEETING

First Day.—*Tuesday, December* 13, 1912.

The following-named members were present:

Abell, Irvin
Baldridge, Felix E.
Baughman, Greer
Bloodgood, Joseph E.
Boldt, Herman J.
Borden, W. C.
Bosher, Lewis C.
Bovée, J. Wesley
Brown, John Young
Bryan, Robert C.
Bryan, W. A.
Burch, L. E.
Byford, Henry T.
Caldwell, C. E.
Carr, William P.
Cathcart, R. S.
Crawford, W. W.
Crile, George W.
Cullen, Thomas S.
Davis, John Staige
Dorsett, Walter B.
Doughty, W. H.
Elbrecht, O. H.
Finney, J. M. T.
Gale, J. A.
Guerry, le Grand
Gwathmey, Lomax
Haggard, William D.
Hagner, Francis R.
Hall, R. B.
Hanes, Granville
Hazen, C. M.
Hendon, George A.
Holden, G. R.
Horsley, J. S.
Hundley, J. Mason
Hunner, G. L.
Irvin, James S.
Johnston, George Ben
Jonas, Ernst
Leigh, Southgate
Long, John W.
Lupton, F. A.
MacLean, H. S.
McGlannan, A.
McGuire, Stuart
McGuire, W. C.
McMurtry, Lewis S.
McRae, F. W.
Marcy, Henry O.
Martin, Frank
Mason, J. M.
Matthews, W. P.
Mayo, Charles H.
Miller, C. J.
Mixter, S. J.
Moore, James E.
Moran, J. F.

Morris, Lewis C.
Morris, Robert T.
Norris, H.
Parham, F. W.
Payne, Robert Lee
Peterson, R.
Ransohoff, Joseph
Reder, Francis
Rees, C. M.
Roberts, W. O.
Robins, C. R.
Rogers, Carey P.
Royster, H. A.
Ruffin, Kirkland
Russell, W. W.
Saunders, Bacon
Schachner, August
Simpson, F. F.
Smythe, Frank D.
Stokes, James E.
Stone, I. S.
Talley, D. F.
Thompson, J. E.
Trout, H. H.
Vance, Ap Morgan
Vaughan, George Tully
Waring, T. P.
Watkins, I. L.
Watts, Stephen H.
Whaley, T. P.
Winslow, Randolph
Wysor, J. C.

Total present, 90.

Letters and telegrams of regret were received from the following Fellows who were unable to attend the meeting: Drs. J. A. Crisler, Rudolph Matas, Lane Mullaly, Robert Carothers, John B. Deaver, S. M. D. Clark, J. E. Cannaday, and John T. Moore.

Morning Session.—The Association met in the Assembly Hall of Hotel Chamberlin, and was called to order at 9.30 A.M. by the Chairman of the Committee of Arrangements, Dr. Lomax Gwathmey, of Norfolk, Va., who said: As Chairman of the Committee of Arrangements, I have the honor, on behalf of the Committee, to call the Twenty-fifth Annual Session of this Association to order. We wish to extend to you a hearty welcome to this section on behalf of the members from Virginia. We shall endeavor to extend to you the courtesies of the State in the form of entertainments that are to be given.

We think the Council made a wise selection in choosing Old Point Comfort as its place of meeting on account of its quietness and accessibility, and we hope you will come again.

I wish to say that this afternoon, on account of the weather being very pleasant, the Commanding Officer of the Fort has very kindly offered to show us the Fort and the working of the big guns. Through the kindness of Major Reynolds, the Commanding Senior Medical Officer, we are to witness a dress parade. We have been extended also the courtesies of the

local club here. This afternoon we shall visit the artillery school, and also witness the fortifications. We shall have the opportunity of seeing how these big guns are manipulated. We shall not have the opportunity, I regret to say, of seeing one of these large guns shoot, as I understand it costs two or three hundred dollars to shoot one of these guns once.

Tomorrow evening the members of the State Medical Society of Virginia will extend an invitation to a smoker which will be held in the hotel.

I now have the pleasure of turning the meeting over to your President, Dr. Finney.

Dr. Finney (in the chair).—It is unnecessary for me to thank the Chairman of the Local Committee of Arrangements for the delightful program he has outlined. I am sure we will take pleasure in following wherever he leads. It is needless also to add that I take up this gavel, which has been wielded by so many eminent men in the profession, my predecessors, with a good deal of trepidation, and I shall ask you to bear with the imperfections of the Chair. Without any further remarks, we will proceed with the reading of the first paper.

Papers were read as follows:

1. "Intestinal Obstruction," by Dr. Alexius McGlannan, Baltimore, Maryland.

This paper was discussed by Drs. Bloodgood, Byford, Brown, Jonas, Stone, Moore, Mixter, Mayo, Ransohoff, Haggard, Royster, Finney, Hunner, Hall, Winslow, Marcy, Bovée, Crawford, Dickinson, Milne, Elbrecht, and discussion closed by the author of the paper.

2. "Pancreatic Cysts," by Dr. Lomax Gwathmey, Norfolk, Virginia.

Discussed by Drs. Stone, Winslow, Marcy, Ransohoff, and discussion closed by the essayist.

3. "Increase of Newer Abdominal Surgery due to Increase in Toxic Disturbances," by Dr. Robert T. Morris, New York City.

Discussed by Drs. Horsley, Byford, Caldwell, McMurtry, Moore, Ransohoff, and in closing by Dr. Morris.

4. "A Case of Anterior Dislocation of the Elbow," by Dr. Randolph Winslow, Baltimore, Maryland.

Discussed by Dr. Caldwell and in closing by the author of the paper.

5. "Fractures Into and About Joints," by Dr. Charles E. Caldwell, Cincinnati, Ohio.

Discussed by Drs. Winslow, Law, Morris, McGlannan, and in closing by the author of the paper.

On motion, the Association adjourned until 8 P.M.

NOTE.—There was no afternoon session on account of the visit of the members and guests to the fort.

Evening Session.—The Association reassembled at 8 P.M., and was called to order by the President.

Mr. Robert Milne, of the London Hospital, England, gave a talk (by invitation) on "Fractures of the Femur," and showed several slides.

President Finney thanked Mr. Milne for his interesting remarks and slides.

6. "A Fetal Type of Cecum in the Adult," by Dr. W. C. Borden, Washington, D. C.

7. "Experimental, Anatomical, and Physiological Observations Bearing upon the Total Extirpation of the Colon," by Dr. August Schachner, Louisville, Kentucky.

8. "The Value of Complete Physiological Rest of the Large Bowel in the Treatment of Certain Ulcerative and Obstructive Lesions of this Organ, with Description of Operative Technique and Report of Cases," by Dr. John Young Brown, St. Louis, Missouri.

9. "Surgery of the Colon, with Special Relation to the Methods of Resection and Suture," by Dr. J. C. Bloodgood, Baltimore, Maryland.

10. "The Pseudoperitoneal Caul of the Colon," by Dr. John W. Long, Greensboro, North Carolina.

These papers were discussed jointly by Drs. Horsley, Thompson, Mayo, Byford, Bovée, Ransohoff, Balbridge, Mason, Dickinson, and in closing by Drs. Borden, Bloodgood, and Brown.

On motion, the Association adjourned until Wednesday, 9 A.M.

SECOND DAY.—*Wednesday, December* 18, 1912.

Morning Session.—The Association met at 9.30 A.M., and was called to order by the President.

11. "Sigmoid Adhesion," by Dr. H. A. Royster, Raleigh, North Carolina.

Discussed by Drs. Hunner, Byford, Moore, Dorsett, Dickinson, Bovée, Cullen, and in closing by the essayist.

On motion of Dr. Charles H. Mayo, the following visiting physicians were extended the courtesies of the Association and invited to participate in the discussions: W. W. Keen, Philadelphia; Franklin H. Martin, Chicago; A. A. Law, Minneapolis; Gordon K. Dickinson, Jersey City; Walt P. Conoway, Atlantic City; Major Reynolds, surgeon of Fortress Monroe; Mr. Robert Milne, London, England; Bransford Lewis, St Louis; J. W. Handley, Nashville; T. J. Windell, Louisville; Thomas F. Lowe, Washington, D. C.; E. S. Judd, Rochester; E. P. Richardson, Boston; and William D. Phillips, New Orleans.

12. "Proctoclysis; Experimental Study," by Dr. Hugh H. Trout, Roanoke, Virginia.

Discussed by Drs. Bovée, Jonas, Crile, McGlannan, McRae, Parham, Dorsett, Finney, Milne, Elbrecht, Carr, and in closing by Dr. Trout.

The President appointed as an Auditing Committee Drs. H. H. Royster, Chairman, Hugh H. Trout, and L. E. Burch.

The President appointed as members of the Council Drs. I. L. Watkins, Montgomery, and W. F. Parham, New Orleans.

On motion of Dr. Henry O. Marcy, the ladies were invited to listen to the address of President Finney.

Dr. William D. Haggard moved that the time for the delivery of the presidential address be set for 3 o'clock.

Motion seconded and carried.

13. "Head Injuries," by Dr. Ap Morgan Vance, Louisville, Kentucky.

Discussed by Drs. Caldwell, Elbrecht, and Marcy.

14. "Sarcoma of the Small Intestine with Report of Cases," by Dr. C. Jeff. Miller, New Orleans.

Discussion by Drs. Smythe and Stone.

15. "Report of a Large Cyst of the Uterus," by Dr. Dyer F. Talley, Birmingham, Alabama.

Discussed by Drs. Boldt, Cullen, and in closing by the author of the paper.

16. "Report of Five Cases of Extra-uterine Pregnancy, Operated the Second Time," by Dr. Stuart McGuire, Richmond, Virginia.

Discussed by Drs. Hall, Dorsett, Boldt, Mayo, Bovée, Stone, Dennis, Caldwell, Marcy, Jonas, Cullen, and in closing by the essayist.

17. "Indications for Abdominal Cesarean Section," by Dr. Reuben Peterson, Ann Arbor, Michigan.

On motion, the Association adjourned until 2 P.M.

Afternoon Session.—The Association reassembled at 2 P.M., and was called to order by the President.

18. "The Identity of the Cause of So-called Postoperative Hyperthyroidism and Postoperative Wound Fever, and the Method of Controlling Both," with Lantern Illustration, by Dr. George W. Crile, Cleveland, Ohio.

Discussed by Dr. Carr.

At this juncture, Dr. Carr, Vice-President, took the chair, and President Finney delivered his address.

He selected for his subject "Surgical Judgment."

On motion of Dr. Moran, a rising vote of thanks was extended to President Finney for his interesting and admirable address.

The Secretary announced that the Virginia members of the Association would give a smoker and vaudeville entertainment at 9.15 P.M., in the ball room of the Chamberlin Hotel, to which all the members and guests were invited.

19. "(*a*) Abdominal Pregnancy of Full Term with a Living Child; (*b*) Experimental Devascularization of the Intestines, with and without Obstruction," by Dr. J. Shelton Horsley, Richmond, Virginia.

Discussed by Drs. McGlannan, Carr, Marcy, Bovée, Wysor, Moran, and discussion closed by the essayist.

20. "Further Report on Nitrous Oxide Oxygen Anesthesia," by Dr. Southgate Leigh, Norfolk, Virginia.

Discussed by Drs. Hagner, Stone, Lawe, Boldt, Morris, Robins, Ransohoff, and discussion closed by the author of the paper.

21. "The Use of Iodine in the Treatment of Infections of the Uterus and Fallopian Tubes," by Dr. J. Wesley Bovée, Washington, D. C.

Discussed by Dr. Stone, Marcy, and Jonas.

22. "Which is the Best Operation for Cancer of the Uterus?" by Dr. Herman J. Boldt, New York City.

Discussed by Drs. Peterson, Bovée, Hundley, Cullen, Hall, and in closing by Dr. Boldt.

23. "Gastric and Duodenal Ulcers with Special Reference to the Method of Operative Procedure Employed," by Dr. Frank Martin, Baltimore, Maryland.

Discussed by Dr. Winslow.

On motion, the Association adjourned until 9 A.M., Thursday.

THIRD DAY.—*Thursday, December* 19, 1912.

Morning Session.—The Association met at 9.30 A.M., and was called to order by Vice-President Carr.

24. "Remarks on Fatal Hemorrhage From Erosion of the Gastroduodenal Artery by Duodenal Ulcers," by Dr. James E. Thompson, Galveston, Texas.

Discussed by Drs. Caldwell, Dickinson, McRae and in closing by the essayist.

25. "Fat Hernias," by Dr. Joseph Ransohoff, Cincinnati, Ohio.

Discussed by Drs. Finney and Caldwell.

26. "The Pathological and Surgical Import of Certain Recent Investigations Concerning the Embryology of the Genito-urinary System" (by invitation), by Dr. Louis B. Wilson, Rochester, Minnesota.

27. "A Study of Unilateral Hematuria of the So-called Essential Type," by Dr. R. L. Payne, Jr., Norfolk, Virginia.

28. "Acute Hematogenous Infection of the Kidney," by Dr. J. M. Mason, Birmingham, Alabama.

29. "The Surgery of the Single and Horseshoe Kidney," by Dr. Charles H. Mayo, Rochester, Minnesota.

These four papers were discussed jointly by Drs. Milne, Hagner, Ransohoff, Lewis, Hunner, and discussion closed by Drs. Wilson, Payne, Mason, and Mayo.

Dr. H. A. Royster, Chairman of the committee appointed to audit the books of the Secretary and Treasurer, presented the following report: We, the undersigned members of the Auditing Committee, have examined the accounts of the Secretary and Treasurer and have found them correct, with a balance on hand of $1294.08.

On motion of Dr. George Ben Johnston, the report was accepted as presented.

The Secretary presented the following report of the Council:

REPORT OF THE COUNCIL

1. The Council recommends with regret the acceptance of the resignation of Dr. Michael Hoke, of Atlanta; Dr. H. J. Whitacre, now of Spokane, and Dr. F. Gregory Connell, of Oshkosh, Wisconsin.

2. The deaths of our distinguished Fellows Dr. Maurice H. Richardson of Boston, and Dr. James B. Murfree, of Murfreesboro, are sorrowfully recorded, and it is recommended that their lives and works be memorialized in the forthcoming volume of TRANSACTIONS.

3. The following names are nominated for Fellowship:

Drs. Bransford Lewis, St. Louis, Missouri; Raymond C. Turck, Jacksonville, Florida; E. S. Judd, Rochester, Minnesota; Battle Malone, Memphis, Tennessee; Edward P. Richardson, Boston, Massachusetts; George Walker, Baltimore, Maryland; and William R. Jackson, Mobile, Alabama.

4. The Council recommends that Atlanta, Georgia, be the place of the next meeting, and Dr. Floyd W. McRae be appointed Chairman of the Committee of Arrangements.

5. That the vacancy in the Council caused by the limitation of service of Dr. Howard A. Kelly be filled by the retiring President J. M. T. Finney.

6. The following are nominated as officers for the ensuing year:

President, Dr. John Young Brown, St. Louis, Missouri; *Vice-President*, Dr. Ap Morgan Vance, Louisville, Kentucky, and Dr. Lomax Gwathmey, Norfolk, Virginia; *Treasurer*, Dr. LeGrand Guerry, Columbia, South Carolina; *Secretary*, Dr. William D. Haggard, Nashville, Tennessee.

All of which is respectfully submitted.

W. O. ROBERTS,
STUART MCGUIRE,
BACON SAUNDERS,
I. L. WATKINS,
F. W. PARHAM,
J. M. T. FINNEY.

Dr. Lewis S. McMurtry.—I move that the report of the Council be accepted and its recommendations adopted.

Motion seconded and carried.

The President appointed Drs. George Ben Johnston and Randolph Winslow to escort the president-elect to the Chair.

Dr. Brown, in accepting the presidency, said: Mr. President and Fellows of the Association: I feel certain that if our distinguished Fellow, Dr. Crile, was here this morning and saw fit to examine me, he would find that my temperature has arisen, and that my pulse-rate has increased forty beats; in

other words, I am suffering from the combined condition of gratitude and fright. I am a poor extemporaneous speaker at best, but I would be dumb indeed if I failed to express my gratitude for the high honor you have conferred upon me. I appreciate it as an honor, and I also realize its responsibilities. I can only say, that I am profoundly grateful, and in the discharge of my duties I will put forth my very best efforts. I thank you.

Dr. Finney, in retiring from the presidency, said: I want to thank you as best I can for the honor which you have done me, and which I shall always consider one of the highest that shall ever come to me.

In turning over to my successor this emblem of authority (referring to gavel), I can only wish for him the same kindly courtesy and consideration that have been extended to me and the same blindness to my faults.

At the conclusion of Dr. Finney's remarks, Dr. McRae said: We did not know what was in store for us in Atlanta. We are delighted that you have chosen Atlanta as the next place of meeting. We extend to you a most cordial invitation to come and be with us, and especially to bring your wives, daughters, and sweethearts, and we will give you a Southern welcome and a sample of genuine Southern hospitality.

Dr. Southgate Leigh.—I have been requested to bring before this Association the question of cancer education. At the last meeting of the Clinical Congress of Surgeons, held in New York City, the following resolution was adopted:

Resolved, The time has arrived for the surgeons and citizens of this country to institute a campaign of publicity with reference to cancer, extending the scope of the work of the committee to embrace cancer in all of its forms, and to authorize the committee to enlarge its membership so as to include representatives from every part of America. The original committee met yesterday and outlined some of the work which it is proposed to do. It now asks the endorsement and coöperation of this Association.

The President.—What is your pleasure in regard to this resolution?

Dr. Baldridge.—I move that it be referred to the Council.

Dr. Finney.—This is a matter of vital importance. As I understand, the Council cannot be called together to consider this matter until next year, and it is too important to post-

pone for another year. I would therefore move that a committee of five be appointed by the Chair to coöperate with this other committee and to give that committee our endorsement.

This motion was seconded by several.

Dr. Rufus B. Hall.—It occurs to me, if this committee coöperated without the endorsement of this Association, the former committee would not get what they expect or want. They want the coöperation and endorsement of this Association in this work.

Dr. McMurtry.—I am thoroughly in accord with the motion of Dr. Finney, and the only question is how best to proceed. I was present at the meeting of this committee yesterday, which was informal, and which has in charge this work of a publicity campaign about cancer. That committee is a very extensive one; it is already organized, and what they want is simply the endorsement of bodies like this. If we appoint another committee, I think perhaps we would rather hinder than facilitate the work, and what this committee wants is the cordial endorsement and coöperation of this Association. I believe that is the best we can do.

To appoint another committee would multiply the number of men engaged in committee work, whereas the purpose can be best served by having one general committee to conduct the work.

Dr. Finney.—I will withdraw my motion and if there is no objection, incorporate the suggestion of Dr. McMurtry in the form of a motion, namely, that this Association go on record as heartily approving this movement.

Motion seconded and carried.

30. "Operative Complications of Prostatectomy," by Dr Francis R. Hagner, Washington, D. C.

31. "Prostatectomy with Special Reference to the Sequels," by Dr. James E. Moore, Minneapolis, Minnesota.

Discussed by Drs. Haggard, Hagner, and in closing by Dr. Moore.

On motion, the Association adjourned until 2 P.M.

Afternoon Session.—The Association reassembled at 2 P.M. and was called to order by the President.

32. "The Operation for Flat-foot; Report of an Interesting and Successful Case," by Dr. W. P. Carr, Washington, D. C.

Discussed by Dr. Matthews, and in closing by the essayist.

33. "A Cheek Defect and Its Repair by Plastic Operation," by Dr. John Staige Davis, Baltimore, Maryland.

Discussed by Drs. Finney, Ransohoff, Carr, Parham, Mayo, Jonas, and in closing by the essayist.

34. "Pylephlebitis," by Dr. Charles R. Robins, Richmond, Virginia.

Discussed by Drs. Bloodgood, Mayo, Caldwell, Hunner, and in closing by the essayist.

35. "A Sign of Diagnostic Value in Obscure Cases of Chronic Appendicitis Elicited By Rectal Palpation," by Dr. Francis Reder, St. Louis, Missouri.

Dr. Francis R. Hagner moved that votes of thanks be extended to the Secretary for selecting such an excellent place for the meeting; to the Virginia members for the good time given the Association; to Dr. Gwathmey for making suitable arrangements for the meeting; to the officers of the artillery school; to Mr. Chamberlin, of the Chamberlin Hotel for suitable accommodations; to Major Reynolds and other members of the medical corps for courtesies extended to the Association; and that the Secretary be instructed to notify these gentlemen of the votes of thanks extended to them.

Motion seconded by several and carried.

On motion, the Association then adjourned to meet in Atlanta, Georgia, December, 1913.

W. D. HAGGARD
Secretary.

ADDRESS OF THE PRESIDENT

SURGICAL JUDGMENT

By J. M. T. Finney, M.D.
Baltimore, Maryland

First, let me express to you, the Fellows of the Southern Surgical and Gynecological Association, my deep appreciation of the high honor that you have conferred upon me in selecting me to preside over your deliberations. My cup of happiness would be just now overflowing but for the sense of unworthiness upon my part to fill so exalted a position. However, since you have brought it upon yourselves, I can only say, I thank you; I shall ever esteem the Presidency of this Association, comprising, as it does, among its membership the leaders of surgical science and art in this country, one of the highest honors that can ever come to me.

"Life is short, art is long, experience fallacious, judgment difficult." With the pregnant aphorisms of the illustrious Father of Medicine, every member of this Society is doubtless quite familiar. Fruitful with suggestion, they, along with other of his writings which have come down to us, merit frequent reading, and will richly repay careful study. Even in this twentieth century of advanced knowledge and boasted scientific achievement, a close acquaintanceship with them will stimulate thought and action to higher purpose and to greater endeavor. Indeed, in view of the

indifferent character of much of the work that is still being done, of many of the doctrines that are still being taught, of much of the literature with which the medical press teems (to use a mixed metaphor), "half-baked" and crude as much of it is, and yet, nevertheless, often stated in terms of Delphic cocksureness—in view of all this, let me repeat, it would appear that the sage aphorisms of the great Hippocrates that have to do with the fallaciousness of experience and the difficulty of judgment, acquire a new significance, and apply to our day and generation with peculiar force and meaning.

It has seemed to the speaker, therefore, when reviewing the various topics appropriate for consideration in an address such as this, that it might be worth while upon this occasion to depart somewhat from the conventional, and to attempt to analyze, imperfectly though he may, wherein, more especially in the domain of surgery, lies the great difficulty in the way of the attainment of sound and correct judgment, and in what consists the fallacy of experience.

This is a difficult task which we have set ourselves, because it will be at once apparent that judgment and experience are very closely associated and interdependent, the one upon the other, and that in the consideration of each one separately, and in their several relations, one with the other, there are many different factors to be borne in mind, the relative measure of importance of which it will be found impossible accurately to determine.

So far as experience is concerned, it will be readily admitted that the fallacy to which Hippocrates has reference must, from the nature of the case, be inherent. It lies in the improper interpretation of certain phenomena which, from time to time, have come under observation. Furthermore, there is also the liability to error in the correctness of the observations themselves, and, not only this, but there is additional opportunity for error in the fact that these experiences which must of necessity be recurrent in character

(obviously they cannot all happen at once), must be recorded in the mind of the observer or upon paper, or by other mechanical device for temporary or permanent record. To err is human! It would seem, therefore, unnecessary to repeat what must be apparent to all, namely, that the possibility of error, common to everyone of these phases, is very real, nay, more than this, owing to the imperfection of our sense perceptions, of all of our mental faculties, of our so-called instruments of precision, of our records, there must be somewhere the absolute certainty of error. It is simply a question then as to how relatively great that error will be, and not as to whether or not it will exist at all. Since, then, as we have seen, experience is founded upon repeated observations of certain phenomena, and observation of these various phenomena is made through the senses, and record must in some way or other be made of these observations for subsequent reference, and then by processes of the mind, they must be rightly interpreted in order to form the basis of correct judgment, it can readily be seen that in this interchange, abundant opportunity for error will be afforded.

Let us pursue this line of reasoning a little further. Since these various stages through which experience must necessarily pass before it can express itself in terms of definite action, are so prone to error, and since in so many important decisions where experience is looked to for guidance, and since it so largely influences our judgment and actions in the domain of surgery, as it does in all other affairs of life, and since it often, quite unconsciously perhaps, plays such an important role in controlling and directing our impulses, it would appear to be of the utmost importance to consider this problem from a practical standpoint, and to point out, if possible, some way in which improvement along these lines can be made, and our accumulated experiences, an extremely valuable asset when properly interpreted and utilized, rendered less liable to error. This is the purpose

of this address. The speaker, even if he were able to do so intelligently, has no desire to invade the domain of psychology or to launch into a discussion of abstruse philosophical subjects which may possibly be suggested by the topic chosen, but which would be distinctly out of place upon an occasion such as this.

The practical question suggested by this discussion which concerns every one of us, and, not only us, but our patients as well, is this: "Is there any way in which this liability to error can be materially reduced and our experiences, vast and varied as they are, rendered a safer guide to our judgment?" Fortunately for all concerned, to this query an affirmative answer can be given. Many, indeed all, of the processes involved, are capable of development and improvement. In other words, we are at once confronted with the problem of education, medical education, in some of its manifold forms; and when I use the term "medical education," I do not use it in any restricted sense. I do not have in mind simply the four years that are ordinarily spent in the medical school, and the year or two in the hospital, for are we not, all of us, at any rate those who will, all the time learning, being continually educated, led out, as the word implies, into larger fields, with an ever widening horizon, with attractive vistas opening up here and there, beckoning us on and inviting us to enter into other spheres of greater opportunity and usefulness?

It is not our intention, however, to discuss the general question of medical education, further than to indicate, if possible, certain ways in which it may have a distinct bearing upon the subject under discussion. To do more than this would be foreign to our purpose, and would lead us too far afield.

It will be readily admitted, I believe, that the physician above all others, is the man whose education should be broad and complete, for to him are entrusted the lives of his fellow men, and inexperienced physicians, young or

old, without adequate preliminary and professional training, should not be permitted to practise so serious a profession. Unfortunately, however, for one reason or another, such permission is now readily granted. The fault lies partly with the public in not only permitting but, to a certain extent, encouraging the ignoramus and the charlatan. It would go a long way toward the eradication of this evil if the public would exercise more care and discrimination in the selection of medical men, especially surgeons. The true, well qualified physician, and the self-styled doctor do not and ought not to look alike. But the blame for this deplorable condition of affairs lies chiefly with the profession itself, for it is a lamentable fact that medical education and ideals in this country are low—lower, perhaps, than in other civilized countries. The reason for this is because our medical colleges are, on the whole, so far below the standard set by the rest of the civilized world that it shames us to make the comparison. These facts have long been known and bitterly deplored by the more enlightened members of the profession, but the investigations of the American Medical Association, covering a period of several years, and the exhaustive work of Mr. Abraham Flexner of the Carnegie Foundation, recently published, no longer leaves the public any valid excuse for their ignorance of or apathy toward the prevailing conditions. As a result of the effect produced by this report, a considerable number of low-grade medical colleges throughout the country have been compelled to close their doors. In this connection, let me quote from the late Dr. M. H. Richardson, an honored Fellow of this Society, a man who was himself the personification of the best type of surgeon, and who represented the highest ideals in the profession. He says: "The task before me is a serious criticism of what is going on in every community. There is to my mind no doubt whatever that surgery is being practised by those who are incompetent to practise, by those whose education is imperfect, who lack natural

aptitude, whose environment is such that they never can gain that personal experience which alone will really fit them for what surgery means today. They are unable to make correct deductions from histories, to predict probable events, to perform operations skilfully, or to manage after-treatment."

What a scathing criticism of our beloved profession, and the special sting of it lies in the fact that it is unfortunately only too true! Let us for a moment consider this question, for it is fundamental to the production of sound judgment, and let it be understood that what is here said is said in no "I am holier than thou" spirit, for every honest man knows that he makes mistakes, both of judgment and execution, and the writer is no exception to this rule.

From the very nature of the case, surgery must be considered as a specialty and the attributes of specialism are insight, knowledge, and experience, and their proper application to practice is impossible without thorough comprehension and mastery. This can only be properly done by one who has been trained from his youth up, and who has been thoroughly well grounded in the fundamentals of the science. Unless one knows and thoroughly appreciates the principles concerned in the handling of tissues, in the repair of wounds, in the causes and results of inflammation, in the characteristics and manner of growth of malignant disease, in the principles of physical science involved in the production and reduction of fractures and dislocations, and in a hundred other points of importance, which time would fail us to mention, he cannot ever hope to get a thorough grasp of questions which are vital to the complete understanding and proper management of surgical problems of every-day occurrence.

It has been said that a surgeon, like a poet, is born, and not made. Personally, I do not believe that this statement is altogether true. Unquestionably, some individuals are born with a natural aptitude for surgery, a something which

has been characterized as the "surgical instinct," and which every teacher can recognize at once as present in varying degrees in the medical students under his care. It is very far from the speaker's purpose to belittle in any way the art of surgery, which is of very great importance, and which in the hands of some skilled operators has certainly become developed to the highest degree. It must be conceded, nevertheless, that however high a pinnacle the art may occupy, the science of surgery will always overshadow it, and unless one is well grounded in the principles of true scientific surgery, it must degenerate into something of a trade or a sort of sleight-of-hand performance.

My honored preceptor, the late Dr. John Homans, of Boston, a man of wide experience and excellent judgment, and possessing in an unusual degree the characteristics and knowledge which we have been endeavoring to describe, remarked upon one occasion, "Any fool can cut off a leg; it takes a surgeon to save one." This very well illustrates the point I am endeavoring to make. Surgery is not alone an art. There is a wide distinction between operator and surgeon. The day of the barber surgeon is over. It is a science founded upon certain fundamental principles, without a thorough knowledge and understanding of which, no man can do his patient or himself justice.

Now what is the application of all this? If our premises are correct, the conclusion is obvious, namely, that no doctor, no matter who, without a thorough surgical training, has the moral right to attempt to make a practice of surgery. He may succeed in doing certain minor operations or even certain major operations well, he may learn to do, mechanically, certain things fairly satisfactorily to his patient and to himself, and he may have a fair percentage of success, but sooner or later he will meet his limitations, and in attempting to go beyond these, with his limited and imperfect equipment, some of the catastrophies of surgery are liable to happen, and then who pays the price of his

ignorance and temerity? Yes, let me repeat, surgery is far too serious a matter to be lightly undertaken by those who are not thoroughly trained in the fundamental principles underlying its proper performance. Right here let me sound a note of warning, and in so doing I do not wish to be misunderstood—the tendency nowadays is toward the multiplication of hospitals, a tendency that is to be encouraged under proper safeguards. With the general proposition that a hospital is the only place in which to be sick, that is, surgically sick, I am in the heartiest accord, provided only that the hospital is under proper management, and that the surgeon, for I am speaking now only of the surgical aspects of the question, is thoroughly competent to handle surgical cases. But what do we see? As a matter of fact, in my own State, and I think that it probably is a correct index of the situation throughout the country, hospitals are multiplying in many of the smaller towns, towns of a few thousand inhabitants, where there are few or no skilled surgeons, and—here is the danger—where the general practitioner, against his better judgment, is tempted to essay the role of surgeon. There are two general reasons for this, aside from the undesirability of performing any operation in a private house. In the first place, the responsibility for a surgical operation in a private house is undivided. The surgeon alone is responsible for the good or bad results, whereas in a hospital it is somewhat different. The cause of this is not easily explained, but it is true, nevertheless, that in the case of a patient operated upon in a hospital, there is not the same feeling of individual responsibility upon the part of the surgeon held by the community at large, as in the first instance. In the second place, under cover of the hospital, and in the more or less seclusion of its operating room, the would-be surgeon is tempted to do things that he would not dare to do under other circumstances. Particularly is this true, and this is no joke, where the operating room is furnished with all the modern appli-

ances of the up-to-date hospital. I have in mind now a certain beautiful operating room in a hospital in a small city, a room walled and ceiled with marble, finished with polished brass and shining glass, everything in it of the costliest description. What is the result? It would appear to the uninitiated impossible in such a hygienic sanctuary, to commit a surgical sin, and yet one constantly sees in that operating room heinous crimes committed against the most fundamental surgical principles and technique, which ought always to be kept inviolate. And why is this? Because of those who habitually use this room, not one is a trained surgeon, they have, so to speak, just picked it up. In the gradual evolution of this palpably wrong condition of affairs, the surgeon himself, or more strictly speaking, some surgeons are not wholly blameless. There is no royal road to surgery. There is no such thing as surgery made easy. There is no trick about it that can be learned in a ten-lesson course by watching the manual dexterity of some specially clever operator, and hearing him vociferously declaim against the old, accepted principles of the fathers and the newer scientific or so-called laboratory methods. It is easy to be led by such false gods into believing that anybody can perform a surgical operation; it looks so easy, and it seems so simple as they do it. But do not be misled into the fatal error of supposing that this is all there is to it. It means a long, hard journey, years of close application and study, of mental and manual training, of observation and investigation in hospital ward and laboratory, before a man can acquire the experience, the insight, the judgment in sufficient degree to entitle him to the proud distinction of being rightly called a surgeon, and all that it implies. Says Valentine Mott, than whom I know of no one better qualified to judge: "We regard those as surgeons and those alone who have by conscientious devotion to the study of our science and the daily habitual discharge of its multifarious duties, acquired that knowledge which renders the

mind of the practitioner serene, his judgment sound, and hands skilful, while it holds out to the patient rational hope of amended health and prolonged life." (Quoted by Barnesby.)

The remedy for all this is obvious—do not abolish hospitals, but restrict the practice of surgery to the trained surgeon. There would then be no further excuse for such books as that which has recently appeared by Barnesby, entitled *Medical Chaos and Crime,* much of the contents of which is unfortunately only too true.

There is also a moral side to this question. The inexperienced operator, owing to lack of proper training and insufficient experience, is often necessarily at fault, both as to his judgment and execution. He is attempting to do something that, in the vast majority of cases, he is not competent to do for the reasons above mentioned. He is placing himself in a false position before the community, and is laying himself open to charges which in the present enlightened condition of the public, and certainly in some parts of the country, it would be difficult for him to disprove. There are those in every community who, stimulated by shyster lawyers of the ambulance-chasing type, are not slow to take advantage of every mistake, or fancied mistake, upon the part of the operator. It is well, therefore, for every doctor, no matter who, before he essays the part of surgeon, to weigh well the responsibilities that are involved. He should be in a position to prove to an intelligent jury that he has given his patient the benefit of skill equal at least to that which can reasonably be expected from the average well-trained surgeon. This, it appears to me, would be difficult, indeed, impossible for the untried operator to do. The thoroughly conscientious man will think twice and go very slowly before allowing himself to be forced, through an error in judgment, into this position. Of course, I am not now referring to those cases of emergency surgery which every physician at times is called upon to

perform. In these instances, common humanity and surgical instinct demand that the best be done for the patient, and that immediately, even to the extent of a capital surgical operation, in order to relieve his suffering or to save life, pending the arrival of the skilled surgeon. Then, too, this matter of operating by those not prepared for it, tends toward the lowering of moral and ethical standards in other directions. It is a great temptation to do this, sometimes because the vast majority of doctors are dependent for their living upon the returns from their practice, and it frequently means a great deal for a doctor to turn over to the surgeon a good patient, perhaps wealthy and prominent in the community, in which event the surgeon, after the operation, collects a substantial fee, while the doctor too often receives little or no recognition or pecuniary return for his advice and services.

The cure for all this is to come by enforcing the highest standards in medical ethics and in medical education, and it is to be hoped, an added hospital year as a prerequisite to practice.

It is our duty, yours and mine, to see that medical education is limited to those institutions that can and do give proper opportunities to their faculties and students, and who have sufficient back bone to hold both strictly to account. We should also strive to get public sentiment aroused in support of this necessary advance. The signs of the times are fortunately most encouraging; a widespread and intelligent interest is being taken in educational problems. Particularly is this true of medical education, with a resulting increase in moral and material support. Encouraging, too, is the growing number of medical schools that are fighting, against tremendous odds, to modernize their equipment and methods of instruction, to foster research and idealism, and to turn out only such graduates as any one of us might welcome in case of sickness, and to whom we can cheerfully intrust the future maintenance of the

highest medical standards and the progress of medical science and practice.

The point which we have been endeavoring to make clear, and it is the basis of our whole argument, is that education, broad, long-continued, careful, conscientious, comprehensive, thorough, is the foundation of all good, sound, surgical judgment, and that without this previous training there is, in truth, no such thing.

Says President Hibben, "Our general knowledge serves to illumine the specific portion of it, which is the special object under contemplation."

The close relationship existing between experience and judgment has already been referred to. His accumulated experiences are of value to the surgeon only insofar as they are correctly interpreted. They may become a source of positive harm if they are improperly understood or applied. Indeed, the larger the experience one has had, which has been misunderstood or improperly interpreted, the more dangerous does that surgeon become, for his judgment will eventually be so vitiated and warped thereby, that in his mind right may become wrong, and wrong, right. This condition of affairs may be observed in almost every phase of life, in politics, in law, in medicine, even in theology, for what is Christian Science, that bastard offspring of an unholy union between pseudoscience and false religion, what is it but a false interpretation of certain phenomena, the existence of which is well recognized? It has been well said of it that "what is true in it is not new, and what is new in it is not true." What of the various "isms" with which the history of medicine is punctuated? What of certain political dogmas that have from time to time held temporary sway in our own and in other lands? All founded upon false theories, the result of a misconception, an improper interpretation of facts, real or imaginary. Are our own individual experiences always accurately observed and recorded? Are they properly interpreted? And when trans-

formed into action, mental or physical, are they always wisely governed by judgment, ripe, sound, born of accurate observation, correct record, proper interpretation, sane reasoning? Are they?

Shakespeare, whose wonderfully accurate observation entitles him to be heard upon almost any subject, has this to say: "Experience is by industry achieved and perfected by the swift course of time." How very true! The same idea is in a measure conveyed by the adjective most often employed in describing the individual whose experience is such as to entitle him to be heard, and his judgment to a measure of respect above that of his fellows, namely, "ripe." The surgeon, who by his industry in seeking out additional opportunities for observation along all lines pertaining to his profession, by his painstaking accuracy, by his time-consuming thoroughness, by his careful attention to irksome routine and detail, both in examination and record of his cases, and by burning the midnight oil in the study of the recorded experiences of others, and in mature reflection upon those of his own, has at last, his judgment mellowed like ripened fruit, become "perfected by the swift course of time." He it is who has in truth "by industry achieved" experience and a sound judgment.

"In the investigation of any subject concerning which we regard ourselves entitled to a judgment, not only should we seek as wide a range of observation as is possible concerning the facts upon which we found the judgment, but we should acquaint ourselves also with what other men have thought and written upon the subject. This is to be done, not that we may slavishly acquiesce in their judgment, but that by a critical examination of all that is known and reported, we may be the better able to defend our own position or the more reasonably to modify or to abandon it, as the case may be." (Hibben.)

What is it that constitutes good surgical judgment? Is it something that is born in a man and not made? Is it a

thing that one man has without working for, without trying especially hard to get, and which another cannot acquire, no matter how hard he may try? When present as one sees it now and then in certain individuals developed to a marked degree, how does it manifest itself? Can it always be recognized and defined when present, or is it a quality that can better be understood than described?

Before proceeding to define this particular process of the mind, let us try to analyze it a bit, and consider some of its more important characteristics, also some of the aids that may be made use of in its acquisition, as well as some of the more common errors in the way of formulating correct judgment. To begin with, then, one of the most important characteristics of judgment may be defined as insight. By this term, one means some kind of knowledge, but the word has a certain peculiar significance whereby we distinguish what we call insight from knowledge in general. A man knows the names and faces of his acquaintances, but he has some sort of insight into the character of his familiar friends. A physician knows the way to his office where he sees his patients, but if he is a successful doctor, in the highest sense of the term, he has insight into the structure and functions of the human body in health, the nature and laws governing disease, its various manifestations, its causes, methods of prevention and cure. He must have an intimate knowledge of human nature in its varying moods and phases, he must know something of therapeutics and the action of drugs. He must know something of the fundamental sciences of chemistry, physics, bacteriology, biology, physiology, and psychology, etc. He must know something of the indications for and the methods of use of the various instruments of precision used in his calling. In short, insight is a name for a special sort and degree of knowledge, that unites a certain breadth of range, a certain intimate acquaintanceship, a certain breadth of grasp, a certain closeness of intimacy whereby the one who has insight is brought into near touch with the objects of his insight.

"It gives us a view of some connected whole of things, of cause and effect. We can only truly gain this insight when our acquaintance with our object is coherent, close, and personal. It can never be obtained at second hand, many things can be learned by rote and by hearsay, but if you have won insight into your profession, you have won it not without the aid of your own individual experience." (Royce.) Yet experience, characterized by Hippocrates as fallacious, and admitted by common consent to be such, is not of itself sufficient to produce insight, unless the coherence, the breadth of range, the ability to properly correlate and interpret are also present. This insight is not always confined to the scholar or to the learned, but may belong to the unlearned as well. Many otherwise ignorant and unskilled people have won a great deal of insight into the matter that intimately concerns them. Many very erudite and learned people possess little or no practical insight into anything. Why is this? Simply because accurate observation, the proper association of cause and effect, the ability to discriminate between the important and the unimportant, in short, the knowledge that has been gained, is in the former case coherent and personal, while in the latter it is vague and impersonal, and cannot, therefore, serve any practical purpose.

It goes without saying that honesty is fundamental to the production of good judgment. This fact is at once recognized by the laity as well as by the profession. If the slightest suspicion rests upon an individual as to his entire good faith, how quickly and how hopelessly is his opinion upon any matter discredited. How can any one reach a proper conclusion who has been dishonest in his premises? How easy it is to fall into dishonest ways, not intentionally so, perhaps, nor willingly, but nevertheless dishonest. Thoughtlessness, possibly even carelessness, as to methods, too much haste in the endeavor to do more than one is able to do properly, lack of thoroughness, neglect to make use

of instruments of precision, of advanced knowledge and up-to-date methods, all essentially dishonest practices tend to vitiate one's judgment.

The value of keen and accurate observation cannot be well overestimated. It is the straws that tell which way the wind is blowing, and so it often is in drawing conclusions, or in the matter of judgment, as between two possible views or courses of action. The one whose powers of observation are ever on the alert, trained to see the slightest sign, will often almost unconsciously, by a reflex, as it were, detect certain differences which to another would be entirely lost, or if noticed, would mean nothing, but to him point with unerring accuracy the way to a correct solution, it may be, of a difficult problem. It is well known that now and then in the course of a physical examination the seemingly important facts elicited may tend to mislead, while some at first apparently trivial and unimportant observation may subsequently prove to be the key to the situation. This is especially true in matters of diagnosis. I am sure we can all recall numerous incidents of this in our own experience.

What, for instance, is the significance of the sudden cessation of pain occurring in the course of an appendicitis? Is it a good or bad sign? How about its relation to changes in the pulse-rate? What about that suggestion of dimpling in the skin overlying an otherwise harmless appearing tumor of the breast? What is the meaning of the so-called "air-hunger" which may be the first recognizable expression of an unsuspected, internal, concealed hemorrhage? It is not chance, it is not having one's luck with one that enables one observer to recognize at once these from among the mass of irrelevant matter as the facts of real import, while to another their true significance is entirely lost.

The faculty of accurate observation can be increased by acquiring the habit of examining everything within the field of vision. We fail to see many things because we fall into the easy way of passing them by without noting their

presence or appreciating their significance. It was said of Charles Darwin by his son that: "He wished to learn as much as possible from every experiment so that he did not confine himself to observing the single point to which the experiment was directed, and his power of seeing a number of other things was wonderful." (Quoted by Hibben.) The open-eyed vision is the prime requisite for scientific investigation. This faculty can be encouraged and developed in students by their teachers and it can be done, it seems to me, far better than in any other way, by individual instruction and bed-side observation. Just here comes in the great benefit of dispensary and ward instruction in small groups, where the student can live, as it were, with the patient, and where the instructor can, man to man, discuss with the individual student the various clinical phenomena as they develop, and give to each single symptom observed its true weight and significance. Didactic lectures and teaching undoubtedly have their place in medical education, they have rendered excellent service in the past, but nothing can take the place of the personal contact, the marked individuality which a real teacher possesses and which is unconsciously and indelibly stamped upon his pupils. What more striking example of the truth of what has just been said than is furnished in our own profession by the great Billroth, who for a generation was the leader of surgical thought in Europe, and who himself, during this period, trained those who subsequently became themselves the heads of the best of the great German clinics. His genius is reflected today and may be seen and easily recognized in that one of his illustrious pupils still living, Professor von Eiselsberg, of Vienna, a shining example of the possibility of combining in the same individual the highest scientific attainment, remarkable technical skill, a charming personality, and crowning all, a judgment that seems almost inspired, a living, speaking likeness of his great master.

It would appear to the speaker that the career and accom-

plishment of this great teacher is an irrefutable argument in favor of the possibility of developing in students the power of perception, the scientific spirit, the accurate analysis, the clear judgment which makes them masters and leaders of men. For it is inconceivable that it was a mere matter of chance that brought together in his clinic a body of men of superior intellectual and professional attainments which must of necessity, and in spite of, rather than because of his influence, rise to the top. Undoubtedly Billroth was an excellent judge of men, and was able to pick out of the crowd as his personal assistants those of superior ability and capable of the highest development. This was but an additional evidence of his own good judgment which was so abundantly shown in other ways. What an inspiration and example to all of us teachers and practitioners as well to follow and to emulate.

How often one sees reflected in the student the methods of thought and action of the teacher, a pet phrase, a characteristic pose, some particular idiosyncrasy which brings to mind immediately and unmistakably some strong personality under whose influence, during the formative period of his life, this particular individual has come, or one is often impressed with the widespread influence exerted by the teachings of certain particular schools. Here habits of thought are established in certain well-worn grooves, which may be handed down from generation to generation, practically unchanged. Methods of action are thus influenced to such a marked degree by precedent and custom, that the wheels of progress may be greatly retarded, and advances the efficacy and value of which have long since been established indefinitely delayed. Take, for example, the question of choice of anesthetic and the method of its administration, both in this country and abroad, for the past twenty-five years, and compare methods and results. Progress on both continents has been and is still being delayed, and much unnecessary suffering and discomfort, as well as an appre-

ciable percentage of mortality induced, the direct result of too close imitation and too slavish following of discredited precedent, though often the offspring of eminently respectable parentage. How important, then, for teachers as well as schools, for the teachers primarily make the schools, to stand only for the best in everything in the educational world, in the language of the present-day political vernacular, to be progressively conservative or conservatively progressive, "to prove all things, to hold fast that which is good."

The exercise of judgment, then, does away with the blind following of precedent. It is at times far better and more courageous to discard old precedent and to create new, founded upon correct observations, whether original or not, upon sound conclusions, whether at variance with preconceived notions or so-called authoritative utterances or not, than blindly to accept and to follow supinely an authority, no matter how eminent. In these days of more independent thought and action, authority is not so widely recognized or so highly respected as formerly. While this present tendency has much to commend it, there are certain evident dangers to be pointed out and avoided. In casting off the old, there is the danger of taking up with new and false gods. Fortunately, for surgeons and patients alike, there seems to be less tendency nowadays, perhaps than formerly, to follow certain fads. The days of reckless and indiscriminate operation upon the pelvic organs of the female, of nephrorrhaphy, of gastro-enterostomy, of cholecystectomy, are happily past. The stomach and the gall-bladder are still on the firing line, but the seat of war seems to be gradually shifting to the large bowel and the tonsil. There will probably always be found those whose judgment will be carried away by their enthusiasm for something new, by their eagerness to follow the prevailing fashions in surgery as in dress, but it will also be found that the surgical judgment of such is as hobbled and narrow as the up-to-date style in skirts. It is truly wonderful with what facility the

Aladdin's lamp of the faddist can, for him at least, instantly convert fancy into fact, and thus render an otherwise valuable member of society, or an association of such, not only of little real value, but it may be a positive menace to the human race. Witness the senseless ravings and false accusations of the various societies of the "anti's," the antivaccinationists, the antivivisectionists, etc. Nothing is more fatal to sound reasoning, nothing so productive of mental strabismus as the fad and the hobby.

As has already been suggested, judgment is not always the result of logical processes readily apparent. The line of reasoning is not always easy to follow, indeed at times it cannot be followed except by very close study and analysis of the intervening steps. There may be a sort of Sherlock Holmes method about it, which is not readily understood by the ordinary individual, but which when carefully analyzed, will show that the conclusions arrived at are no more than this, the result of happy chance or good luck, but are the inevitable result of close observation, of attention to the minutest detail, of intelligent thought, of sound reasoning. When this is done, the conclusions must inevitably follow, and they will be right or wrong just insofar as these various intellectual processes have been intelligently and correctly carried out. But there are other factors concerned. One must not be misled into thinking that it is a sort of rule of thumb, a sort of picture puzzle, the pieces of which have been cut into all sorts of fancy and bizarre shapes, and that it is simply a question of mechanically fitting them together. Not at all! Here as everywhere else imagination, constructive imagination, is of the greatest help. As could the great Cuvier, when given but a single tooth, construct the entire skeleton of a prehistoric animal, so can one in his imagination weave the entire pattern from here and there a few broken and tangled threads, supplying those that are missing, and mending those that are broken, until at last there exists in his mind a picture

of the whole, clear, concise, complete, correct. The idealist, the dreamer of dreams, while not always, indeed, perhaps rarely, of a practical turn, is the one who of all others can penetrate deeper into the unknown, can see further into the mists of uncertainty and doubt, can make lighter the dark places of ignorance and uncertainty with the illuminating power of his imagination. In this connection, however, attention should be directed to the condition that imagination in order to be really helpful must at all times be in touch with fact. "It must represent to the mind not what fancy suggests, but what the known facts necessitate." (Hibben.) The unseen is then constructed out of the determining conditions of the seen, otherwise fancy might run riot, and our judgment and hypotheses resulting therefrom, rendered correspondingly weird and bizarre.

One of the fundamental requisites of good judgment must ever be sanity, or what is known as common sense. One never expects from the insane or the foolish an opinion that is really worth anything upon any subject. Unfortunately, however, one need not be an inmate of an asylum for such unfortunates in order to give occasional expression to opinions or exhibit actions worthy of them. Only too frequently one sees in the medical press articles expressing opinions, making suggestions, even giving advice, that one would not ordinarily expect to hear outside the walls of such an institution. It is humiliating to have to admit in such an assemblage as this that some of us, and the speaker feels constrained to include himself in this number, are at times guilty not only of giving advice, but of performing operations, and in such a manner that in the light of further knowledge, more painstaking examination, more careful consideration, more time taken from a life overcrowded, perhaps, with the humdrum of routine and detail, puts us to shame, and which, if we are truly conscientious in our work, effectually prevents any tendency toward the pride and conceit of life. Some people are by nature, perhaps,

more sane, more stable, more normal in their mental processes than others. Some people are perfectly sane on some subjects and not upon others. It is extremely difficult at times to distinguish between the sane and the insane, between the sound and the unsound judgment. "*Sanus mens in corpore sano*," is a trite but true saying.

It does not, however, necessarily follow that a sane mind and good judgment will always be found in a healthy body, nor will an unhealthy body necessarily always be found to house an unsound mind. But universal experience bears out the contention that a mind free from the distractions and worries that necessarily attend upon physical infirmities of one sort or another, or from the cares of business, is in much better condition to grapple with the manifold problems of disease, of diagnosis, and treatment. In our busy lives, filled to the utmost with endeavor to help and relieve others, we are prone to forget self, a virtue always to be cultivated within reasonable limits, but the trouble with us is that we are apt to go to the limit of our endurance, and frequently beyond. Thus in our praiseworthy efforts to relieve others, and in our very self-forgetfulness, we often tend to defeat the end for which we have been striving, namely, to give our patients the very best that is in us in the way of advice and treatment, which are in turn the result of our experience, ripe, wide, wisely interpreted by a brain properly working, which is not already tired out by ceaseless work and worry, and a judgment unwarped and unclouded by the pessimism engendered by a torpid liver or a disturbed digestion.

There are negative as well as positive qualities that go with good judgment, which if not of such high order, perhaps, as the others, are nevertheless of great practical importance. In matters involving action, surgical treatment, operative as well as non-operative, it would be difficult to overestimate their value. In this connection, Billroth has written, "Years and experience bring in their train a certain

degree of hesitancy." One frequently hears the terms radical and conservative applied to surgery and to surgeons as well as to things political. What is their meaning but that one individual or class of individuals is apt more or less blindly to do certain things under given conditions, while the other group is more likely not to do so. A favorite saying of a well-known surgeon, a man of action, but, at the same time, of unusually good judgment, was "Nine men out of ten will know what to do under given conditions, but the tenth man will know what not to do, and he is the most valuable man of the ten." The truth of this saying, I am sure, has been demonstrated upon more than one occasion to everyone in this assemblage. The conservative surgeon is one who will take the time and the trouble necessary to observe his patient for a season sufficiently long to enable him to get some sort at least of a comprehensive and intelligent grasp of the situation before he is willing to express an opinion that may commit him to a definite line of action, especially when that action involves the performance of a surgical operation, however trivial it may appear. For none know better than the experienced surgeon what far-reaching possibilities for good or for evil are lurking behind every surgical procedure. There is such a thing, of course, as overcaution which leads to inactivity and hesitation when resolution and action are urgently indicated. There are times in the experience of every surgeon when the exigencies of the case demand most instant and most radical operation, and when this becomes the height of conservatism, for example, certain forms of rapidly spreading infection, fulminating appendicitis, hemorrhage, beginning malignant disease, etc. Undue haste, however, either at the time of the operation or in the preparation of the case, *i. e.*, operating before the patient is in proper condition or before one is ready to cope properly with any emergency that may arise, are all evidences of poor judgment and are equally reprehensible.

The influence working toward the production of errors of judgment, as has already been indicated, are manifold; far too many indeed to attempt to enumerate them all here. Errors of observation, failure to differentiate relevant from irrelevant facts, or to comprehend the whole situation, limited views, mental astigmatism, preconceived ideas, narrow-minded provincialism, human frailties—all of them play a large part in determining the results of our mental processes. We are so often swayed by prejudice. We are apt to be too much influenced by the character or personality of our patients. We so often see that which we wish to see and fail to see that which we do not wish to see, we are prone to twist the facts to suit the theory, rather than the theory to suit the facts. Thus we deceive ourselves. Our reasoning is at times faulty, "*Post hoc ergo propter hoc*" or "*non causa pro causa*" play far too prominent a part in the formation of our judgments. Our emotions and our passions are given too free a rein. We are so prone to forget that we do not profit as we should by our mistakes. The sacrifice is often for us in vain. As Bacon says, "The human understanding resembles not a dry light, but admits a tincture of the will and passion which generate their own systems accordingly, for man always believes more readily that which he prefers; his feelings imbue and corrupt his understanding in innumerable and sometimes imperceptible ways." (Quoted by Hibben.) This same author, in referring to the errors of judgment due to the common frailties of human nature, has aptly styled them "idols." His enumeration is complete and classic, and is as follows: "Four species of idols beset the human mind to which, for distinction's sake we have assigned names, calling the first, idols of the tribe that is, those inherent in human nature; the second, idols of the den, that is, those peculiar to each individual; the third, idols of the market, that is, those formed by the reciprocal relations of business and society, between man and man; the fourth, idols of the theatre, that is, those

which have crept into men's minds from various dogmas, traditions, and superstitions—all of which tend to clog the mental processes and vitiate judgment."

From this very imperfect review of some of the more important factors, both positive and negative, which go to make up good judgment or to render difficult its attainment, it will readily be seen that with few exceptions, perhaps, those elements tending toward betterment and enlargement of the character and scope of our judgment, are capable of development and improvement, while those idols of the mind, those forces which make for error, and which tend to vitiate and render difficult our judgment may, some of them, at least, be cast down and destroyed, or are by education and experience largely to be eliminated and their influence thereby markedly diminished.

Judgment is then, after all, a thing that can be, to a certain extent at least, acquired by every one. It is assuredly better developed in some than in others, partly by divine gift, born with it, if you will, partly by education and experience. None need despair, however, by conscientious, intelligent application and study to develop the essentials and to avoid the errors, of eventually obtaining a fair proportion, at least, of that most-to-be-desired of all qualities that go to make up a surgeon—good judgment—which, if we were called upon to define in a few words, our answer would be something like this: The ability to discriminate between important and unimportant facts, between the essential and the non-essential, coupled with the ability to draw correct conclusions therefrom. Given, as a foundation, a mind endowed by nature with an average amount of intelligence or even a little more, and of that *sine qua non*, common sense, an even disposition tinctured with the milk of human kindness, a keen perception; develop this by education, fundamental, broad, comprehensive, scientific, special; add to this accurate observation, experience "by industry achieved," a familiarity with the work of others

gained through reading and by travel, time taken to properly assimilate all this and rate it at its true value by thought and investigation, a trained hand, insight into this old human nature of ours, and some knowledge of her various moods and vagaries. Crown this with some of the virtues of the Great Physician, our Master and Teacher, and you have pictured before you the surgeon, fully endowed with that quality which we have but imperfectly described, "surgical judgment," which when developed as we have seen it in the persons of some of our own teachers and friends, both living and dead, is the noblest work of God.

INTESTINAL OBSTRUCTION: A CLINICAL STUDY OF ONE HUNDRED AND EIGHTY-ONE CASES

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The problem in intestinal obstruction is to find the clinical picture which will enable us to recognize obstruction in its early curable stage, and to determine what extent of operation should be performed when the condition is complicated by the results of obstruction—namely, toxemia and gangrene.

In the hope of deciding these points I have analyzed the histories of 181 cases of intestinal obstruction from the records of the Johns Hopkins Hospital and of St. Agnes' Hospital. These cases include 27 varieties, exclusive of strangulated hernia, classified according to causation. They were operated on by fifteen surgeons over a period of twenty years. The personal equation is therefore eliminated, although all the operators followed the same general technique.

The course of an obstruction may be divided into three stages: (1) The stage of onset, when the symptoms are due to the arrest of the intestinal current; (2) the stage of compensation, when the gastro-intestinal organs attempt to overcome the obstruction, or its results, and finally, (3) the stage of sequelæ or complications, when the obstruction has caused secondary destructive changes in the bowel or in the body as an entirity.

The higher and more complete the obstruction, the less clearly defined will be the different stages. In most cases

there will be a merging of the symptoms of the various stages. Vascular injury always intensifies the course of the disease.

Symptoms of Onset. The characteristic symptoms of onset are pain, constipation or diarrhea and vomiting.

Abdominal pain, usually paroxysmal, or described as "cramps," is the most constant initial symptom. Pain occurred early in all the cases. The pain of obstruction is not relieved by defecation or by vomiting. Opium brings temporary relief, but as the effect of the drug wears off the pain returns.

Constipation. The association of pain and constipation at the onset occurred in 30 per cent. of the cases. Constipation may precede the pain (10 per cent.). It may come on after an initial bowel movement. The latter condition is frequently present in the cases of strangulated hernia and of intussusception. This constipation resists well given enemas, or an effectual enema does not give relief from the pain.

Diarrhea. Diarrhea and pain, with blood and mucus in the stools, occurs in intussusception and with intestinal tumors.

Vomiting. Vomiting may be the initial symptom, followed by pain and constipation, but the usual sequence is pain, vomiting, and constipation. Lavage does not relieve the symptoms, a distinction from the vomiting of acute dilatation of the stomach.

The effect of lavage, effectual enema and cathartics on the symptoms of onset was noted in 42 cases. In 25 cases the remedy did not give relief. With this fact demonstrated, immediate operation was performed ten times with ten recoveries. When the operation was postponed until other symptoms developed, there were three recoveries and ten deaths, five of the fatal cases had developed gangrene at the time of operation.

Therefore I feel that whenever a patient suffering from

abdominal pain alone, or pain with either vomiting or constipation, or both, is not permanently relieved by lavage, or effectual enemas, immediate operation is indicated. A similar result following effectual purgatives also indicates operation. However purgatives should not be administered for the relief of these symptoms, to the exclusion of the enema and lavage. If the latter remedies are effectual, no purgative will be required. If these do not give relief, the purgative will do harm.

When the well-given enema or purgative is ineffectual, what is the proper procedure? This condition was noted forty-three times; in 38 cases the patients were allowed to go on to the secondary stage or to that of complication; 4 were operated on during the secondary period, 2 died; 33 after complications had developed, 18 died; 1 patient died without any operation.

Under these circumstances, we wash out the stomach and pour in from 50 to 75 c.c. of castor oil at the end of the lavage, at the same time giving the patient $\frac{1}{3\frac{1}{2}}$ gr. eserine salicylate hypodermically. In the presence of mechanical obstruction this treatment intensifies the primary symptoms and hastens the development of the secondary ones to such a degree that the diagnosis becomes easy.

We have noted this occurrence in 5 cases of post-operative obstruction, all were operated on as soon as the diagnosis was made. In all the obstruction was found and four recovered.

The symptoms of the second stage of obstruction are due to: (1) The efforts of the intestine to force its contents beyond the point of closure (symptoms of compensation); (2) the effect of these efforts on the size and shape of the bowel, and (3) to changes due to involvement of the blood-vessels in the mechanism of the obstruction.

The symptoms of the second stage are pain, vomiting, visible peristalsis, visible stiffened coils, local distention, and tenderness. The pain is paroxysmal or is an increased

severity of the pain of the first stage. In strangulation the pain is continous with paroxysmal exacerbations.

Vomiting of this stage, according to Haguenot, is a running over of the contents of the overfull intestine into the stomach. This vomitus is intestinal contents, often fecal. Lavage has the same value as vomiting in compensating the effects of obstruction, and the greater one of being independent of the patient's reflexes.

When the return flow from lavage has become clear, and during its expulsion, is suddenly discolored by intestinal contents, regurgitation from the intestine is proved, and the diagnosis of obstruction is confirmed. Vomiting or lavage which does not relieve the distension indicates obstruction.

The blood count in obstruction usually shows a marked leukocytosis. In 62 cases the average was 16,000, in but 2 was it below 5000, and in 7 others below 10,000. The highest was 44,000 in a case of sigmoid volvulus.

The blood pressure falls with the onset of symptoms and becomes markedly lowered as toxemia develops.

The effect of enemas, lavage, and purgatives on the symptoms of the second stage: What has been said concerning purgatives in the first stage must be emphasized when speaking of their use in the second stage. No purgative should be given unless the patient is in a hospital prepared for immediate operation, should the purge prove ineffectual or intensify the symptoms. Leakage through distended bowel, actual rupture, gangrene, and other serious complications or sequelæ are likely to follow the violent reaction of strong purgatives.

Enemas. No relief from an effectual enema was noted thirty-nine times in the history of the second stage. Immediate operation was performed on 18 patients, all of whom recovered. A delayed operation was performed on 21, 11 died, 3 having gangrene at operation.

Ineffectiveness of enema or purgatives was noted thirty-eight times; 4 were immediately operated upon, 2 died. All

the other cases when operated on showed some form of complication; 16 died and 18 recovered.

The third stage is characterized by development of toxemia, gangrene or peritonitis and alteration of kidney function. In the 25 St. Agnes' Hospital cases, albumin and casts were found whenever the urine examination was reported.

THE OPERATIVE TREATMENT. The form of operation required in any given case must depend on the nature of the obstruction and on the presence or absence of complication. Thus we group the operations performed into three classes, namely: (1) Relief of the obstruction; (2) excision of intestine; and (3) enterostomy.

In order to judge the efficiency of any of these operations, it is necessary that the procedures be compared with regard to the stage of the disease at which the operation is performed. This is the only logical basis for study of the treatment of obstruction and avoids the confusion of many classes as to: (1) Causation; (2) differences in position of the obstruction; and (3) variations in the completeness of the occlusion. Each of these factors alters the rapidity of development and the duration of the three stages of the disease, consequently a study of intestinal obstruction from the point of view of the symptomatology and treatment of these stages balances the relation of the various factors and makes the comparison of operative statistics possible.

Thirty-four patients were treated in the first stage, all recovered. Of these, 12 were relieved of their symptoms by enemas and purgatives. The other 22 were operated upon, in 15 the obstruction was relieved; resection was performed in 3 cases, enterostomy with short circuiting and enterostomy with relief of the obstruction, 1 each. Simple enterostomy was done twice.

Relief of the obstruction therefore, is the best operative procedure in cases treated during the first stage. When provision has been made for a delayed enterostomy, this

is the best procedure in post-operative obstruction, probably because opening the previously-brought-up loop gives no operative shock.

Sixty-five patients were operated on in the second stage, 55 recovered, 11 of these died as a result of a second operation or some complication developing later than one week after the original operation. The operations performed were as follows: Relief of obstruction, 44, six fatal; short circuiting, 2; excision, 14; enterostomy, 4; enterostomy, with other operations, 15. One patient was relieved by an enema.

Gangrene was present in 10 cases; 2 were treated by anastamosis and excision, 6 were resected, 8 patients recovered.

Relief of the obstruction therefore, seems the best operation in the second stage, provided gangrene has not developed. In the presence of gangrene resection is the best operation provided the constitutional symptoms are not pronounced. In the latter event, enterostomy should be added to the resection, or if the condition of the patient is grave, the loops may be brought out of the abdomen and packed off with gauze, with an enterostomy above the obstruction.

Eighty-two patients were operated on in the third stage, 52 died. Relief of the obstruction was done in 22 per cent. of the cured, 34 per cent. of the fatal cases. Enterostomy and relief in 22 per cent. of the cured, 8.5 per cent. of the fatal. Simple enterostomy in 45 per cent. of the cured, 32 per cent. of the fatal cases.

Enterostomy with other operations in the remaining cases; 3 cured, 9 fatal. Resection was done in 1 fatal case, and extrusion in 2 others; 1 patient was relieved by an enema and 5 died without operation.

Gangrene was present in 15 cases, 2 cured and 13 fatal. In both the cured cases enterostomy and excision was done.

In the third stage enterostomy should be done, either alone or in connection with the other procedures. In the non-gangrenous cases enterostomy was done in 77 per cent.

of the cured and in but 41 per cent. of the fatal cases. However subtle may be the exact cause of death in intestinal obstruction, there can be no doubt that the accumulated material in the occluded bowel is extremely toxic and has a considerable influence on the production of the toxemia. Therefore it is necessary, that in the presence of the symptoms of toxemia we provide an outlet for this accumulated material by making an opening into the bowel above the obstruction. Whether we shall do more depends on the general condition of the patient, but this removal of toxic material is our first duty and if neglected, robs the patient of about one-half of his chances for recovery.

DISCUSSION

Dr. Joseph C. Bloodgood, of Baltimore, Md.—I am familiar with the large amount of work that Dr. McGlannan has given to this subject, and so far as I know, no one has studied critically as large a number of cases of intestinal obstruction, and I think when this completed paper is published you will be surprised at some of the definite conclusions that have been drawn from this study. I think Dr. McGlannan is the first to demonstrate, at least to publish, a very large number of cases showing the importance of the effect of washing out the stomach and of enema in aiding in the early diagnosis of intestinal obstruction—a thing always neglected outside of the hospital, and often neglected in the hospital, namely, the importance of the stomach tube and enema in the differential diagnosis.

There is one point I desire to bring out which struck me as very important, showing the difference between the mortality from early diagnosis and that of late diagnosis. When I went over my cases some years ago I was surprised at the difference between the mortality of cases of intestinal obstruction taking place in the hospital and those outside of the hospital. Those in the hospital had been just subjected to operation, and therefore are not good operative risks, yet the mortality in postoperative obstruction is much less than it is outside of

the hospital, due to early recognition of the trouble, and in the majority of cases the early diagnosis has been due to the use of the stomach tube and enema.

A second point he has emphasized, and one about which there has been considerable discussion in the literature, is the importance of evacuating the bowel either immediately or by enterostomy of the material above the seat of obstruction. Personally, I have been struck with the fact that most surgeons fear emptying the distended intestine in intestinal obstruction at the time of the operation. My own experience has been, and I think Dr. McGlannan's figures will show, that the danger of opening the intestine and evacuating it on the operating table is relatively small as against the danger of letting it get out later through the enterostomy, so that in a certain stage the intestines must be evacuated on the operating table. If in doubt, it is well to resort to enterostomy, and his figures will bring these two points out, which are essential features in the early diagnosis and in the late treatment.

Dr. Henry T. Byford, of Chicago, Ill.—Not all cases of apparent obstruction of the bowels must be hurriedly operated upon for fear of gangrene or sepsis. In postoperative cases we may be reasonably certain that there is no volvulus nor intussusception nor hernia, but may be in doubt as to whether there is really a complete obstruction or sufficient paralysis to terminate fatally. In such cases, if we can introduce three or four quarts of fluid a day into the system by hypodermoclysis, or otherwise, we may be able to carry the patient through a day or two of doubt and still operate under comparatively favorable conditions. It is the loss of fluid that depresses the patients so quickly and diminishes his or her powers of resistance to sepsis. Formerly the majority of my cases were almost beyond the hope of benefit from any operation by the time I felt justified in operating, but by keeping up the fluids in the body and keeping the stomach washed out I now have much more satisfactory results and usually expect to save my patient.

Dr. John Young Brown, of St. Louis, Mo.—My experience has been that in the majority of cases of intestinal obstruction the diagnosis is made without difficulty. The essayist has brought out two very important points that all of us appreciate who have had to deal with these neglected cases that are sent in for late operations. In the majority of such

cases, efforts have been made to purge them, they have been soaked with opium, and they come into the hospital profoundly toxic.

The importance of draining the distended loop of bowel above the obstruction cannot be too strongly accentuated. A number of years ago in a paper before the Mississippi Valley Medical Association held at Cincinnati, I reported a series of gangrenous resections in which I described a method of draining the loop of bowel above the obstruction. The bowel was cut across between two clamps. A third clamp was placed above the clamp on the end of the proximal bowel to prevent any intestinal leakage. A purse-string was quickly thrown around the proximal gut, the clamp removed, and the glass drainage tube to which a rubber hose was attached, was tied in the bowel above. While the distended bowel was being drained by an assistant, the operator was completing the resection, tying off the mesentery and preparing the distal end of bowel for anastamosis. As soon as the button was placed in the distal bowel, the clamp was replaced on the proximal bowel and the the drainage tube removed. The purse string used for the retention of the drain was now utilized for the other half of the Murphy button. Thus, the anastomosis was accomplished without loss of time and the distended bowel above was drained of a great deal of its highly toxic contents. I believe that if all doctors were required to take a six months' apprenticeship with a plumber, the early diagnosis of mechanical obstruction would be readily made by them, and that they would appreciate the damage done by many of the methods applied to its treatment. The cases coming in gangrenous and profoundly toxic, give the highest rate of mortality. The relief of the obstruction is simple, but no matter how perfect the operation may be or how rapidly it may be performed, such patients succumb to toxemia.

If the general practitioner could be taught the danger of the use of cathartics and the greater value of stomach lavage, and the importance of the early operative treatment of these cases, the mortality would be greatly reduced. It is astonishing how quickly the gut will become gangrenous. Within the last six weeks I have had 2 cases, both of strangulated hernia in which resection was necessary; 1, an inguinal hernia, strangulated for six hours, and 1 a femoral hernia, strangulated for nine hours. Both of these cases recovered.

Dr. Ernst Jonas, of St. Louis.—In these cases of intestinal obstruction it is very important to perform operation at the earliest stage. I believe it is true that an early operation by a poor operator in a case of this kind is preferable to a late operation by the most experienced operator.

The essayist has brought out the point that after the unsuccessful use of enema and of lavage of the stomach, if the drastic given by the stomach or given by the mouth should aggravate the condition, an operation is more important than ever. I believe that this is a good rule if the patient is in a hospital. But as a general thing I believe the doctor should be warned against giving cathartics. I believe that cathartics in all these cases only aggravate the condition, and if the enema and lavage do not relieve the patient we should operate.

Dr. I. S. Stone, of Washington, D. C.—I should like to go one step farther than some of the speakers and say that purgatives not only do harm, but they are rarely indicated, as we reach a conclusion before this is necessary. I have never seen a purgative succeed when eserine and enemas have failed to produce bowel movements.

One more point: when regurgitation continues, as a rule it means obstruction and operation. However, there are certain exceptions to that rule, as, for instance in one case where the operation was done for volvulus, where the lower three or four feet of the ileum were found twisted, and anastomosis was satisfactorily done, but the gut was of course temporarily paralyzed.

The enemas brought away a considerable quantity of gas and considerable matter, yet regurgitant vomiting continued for several days. Each time it was corrected and relieved temporarily by the use of the enemas and eserin until finally relief came. I cannot say too much in favor of the use of lavage, which is a most rational treatment of these beginning cases of obstruction, many of which originate in the stomach and are relievable by that simple method.

Dr. James E. Moore, of Minneapolis.—I wish to emphasize the axiom laid down long ago by Greig Smith and mentioned by Dr. Bloodgood this morning, that the distended bowel should be relieved by making an opening into it. Greig Smith said the distended loop of bowel should never be returned to the abdomen. We can all remember in the early days when we began to operate on these cases, when we dared to enter

the abdomen at all, and when we did so, what difficulty we had in reducing the intestine to the abdominal cavity. Later, when Greig Smith pointed out the advantages of opening into the distended loop of bowel, we made openings and milked the intestinal tract through the series of openings, thus emptying the distended bowel without endangering its peritoneal covering, and in that way lessening the danger of subsequent peritonitis. The assistant can do this while the operator is doing the major surgical work, and it adds materially to the patient's welfare.

Dr. Samuel J. Mixter, of Boston.—In looking back on the fatal cases of intestinal obstruction, I think it will be found that death occurred in those cases where the intestine has not been emptied or where anastomosis had been immediately done and the septic contents of the occluded intestine had been poured into the lower intestine—the starved lower intestine. Abbe was the first to point out the fact that the intestine below is starved and ready to take up the material poured down from above, and in that way the patient gets a rapid and fatal sepsis. In emptying the intestine one should use a straight trocar, one of the kind we use for emptying the gall-bladder, and have one, two or more of these, which are plunged into the intestine, penetrating as many loops as necessary, at the point of obstruction, and with a puckering string previously put on there is no escape in such cases of any fecal pea-soup, which is what we find in the intestines.

Another point which is very important, it seems to me, and which is often neglected, and I see it constantly in cases entering the hospital, that is, a possible secondary operation. If the obstruction is in the cecum from malignant disease, a rather commonplace, you find an opening has been made in the intestine just above the obstruction. When you try to do excision later on it is difficult, you have to do with a fecal fistula at the point where you want to operate. If the cecum in that case had been opened there would have been no trouble whatever. If a cecostomy is made at the proper part of the cecum, it is seldom necessary to do a secondary suture operation to close it. It would close itself as soon as the gut below is drained.

Dr. Charles H. Mayo, of Rochester, Minn.—Dr. Mixter's discussion has reminded me of a case which occurred recently in our clinic. The patient was nearly moribund from acute

obstruction which was situated high in the splenic flexure of the colon. There was no time for an extended operation, the intestine and especially the appendix was distended by gases, as occurs frequently in these cases. Making a small incision over the region of the appendix I drew the appendix out of the opening and sutured its mesentery to the abdominal wall. At the end of two hours I cut off the appendix and inserted a catheter to remain for some days in order to relieve the primary obstruction. When necessary the operation for the obstruction is done later. During the past year we have had 4 cases in which the immediate condition was relieved through the appendicostomy incision. It is a mistake to try to do too much for these patients at once. We should try to relieve the obstruction and later deal with the cause.

Dr. Joseph Ransohoff, of Cincinnati.—I desire to call attention to one thing that has not been mentioned in this discussion, namely, the use of the *x*-ray to locate the obstruction in the acute cases. Of course, outside of hospitals this is out of the question, but when a patient is brought into the hospital it takes but a short time to get an *x*-ray picture, and in 3 cases we have had recently the obstruction was located. Of course, one would imagine taking out bismuth mixture by the stomach would be useless, that is, it would be ejected as soon as taken in, and that is true. But one can give enema, and in the course of half an hour after the admission of the patient get a picture of the colon, and it is remarkable how clearly one can see the small intestine distended with gas under the *x*-ray without any bismuth meal having been given. This sort of picture will help a good deal in doing away with the necessity of searching long if the patient is in such a condition that he can stand a radical operation. I fully agree with the sentiments that have been expressed, that we ought not in the very bad cases to search for the *fons et origo* of the disease, but save the patient who is slowly dying of toxemia by simply draining the intestine.

I simply rise to speak of the value of the *x*-ray. I recall one beautiful case in which the picture showed the obstruction positively to be in the ileocecal region, and operation revealed one of these rare forms of retrocecal hernia.

Dr. Robert T. Morris, of New York City.—I am glad Dr. Ransohoff spoke of the value of the *x*-ray as a means of locating the obstruction.

For more than a year I have been using as an injection by rectum bismuth solution, also using it by the stomach as far as possible, and then by the use of the fluoroscope we can very definitely locate the obstruction in those cases in which otherwise we would have to guess very frequently. The only thing that saves the lives of those patients is the reverse peristalsis. They come to me loaded with calomel, with croton oil, and various other things. Dr. Stone by his methods, before the patient gets to his reverse peristalsis, saves the patient's life. With bismuth in the bowel injected from below we can get a picture of the obstruction.

Dr. William D. Haggard, of Nashville, Tenn.—One point that has been brought out has been very gratifying, namely, enterostomy as a temporary measure to save a patient's life. Years ago that operation was done more than it is now, the great objection being that the patient had a fecal fistula. Then came perfected surgical procedures and we felt we must go ahead and do everything at once. Now, we make an effort to relieve the patient by a simple enterostomy, with catheter and suture and let the patient alone. The thing most gratifying to me has been the large number of these cases that have no fecal fistula. I did four enterostomies last year, and in all of them the opening closed primarily as soon as I took out the catheter. In one I never drained at all. The other three required no secondary operation. They were all saved. If we had attempted to do a great deal to these patients, we would have had what seems to be inevitable, a mortality of 50 per cent. It is harrowing to think that the mortality of surgeons throughout the world is 50 per cent. in this terrible condition, whereas a mortality of only 10 per cent. would be legitimate. As we are in such perfect accord about that, I will not say anything further in regard to it.

I desire to speak briefly of the complete inadequacy of enema in these cases. I think it is the most misleading thing I have ever known. As a matter of fact, I do not think an enema ever did or ever will save anybody's life, and in the great majority of cases in which the obstruction is situated in the small intestine, it is the first ten or fifteen feet where the enema is the most effective.

I was called out of town to see a patient with intestinal obstruction, and as soon as I got there after a long run, they met me with the statement that the enema had been effective

and the patient was relieved. An enema is a very misleading thing. It seems to me, that while we have inveighed against purgatives, we ought not to depend upon enemas. I would rather take my chances with a purgative than with an enema. If a purgative does not relieve it will intensify the condition, and an enema simply misleads.

I was struck with one statement I heard made by a surgeon at St. Bartholomew's Hospital, London, who said that he never thought of operating without trying at least one enema under anesthesia in these cases of intestinal obstruction. I think it is unfortunate in this country that we do not give anesthetics in conjunction with our enemas, particularly in cases of intestinal obstruction.

Our late lamented distinguished Fellow, Dr. Richardson, of Boston, told us of cases where he could not relieve the intussusception with the intestine in hand, and is a man going to relieve that condition by putting his fingers through the abdominal wall in that nebulous sort of way? It strikes me as preposterous, so that I believe that while we have cried out against morphine and purgatives, we should now wage war against enemas, as they are the most deceptive things we have to contend with in this murderous disease.

Dr. H. A. Royster, of Raleigh, N. C.—I should like to say a word or two in connection with the remark made by Dr. Haggard in relation to purgatives and enemas. He said he would rather take his chances with a purgative than with an enema, but to my mind a purgative is more dangerous. While an enema may not do any good, it does not do harm. A purgative is the other way.

The whole question with intestinal obstruction is this: Has the patient real organic obstruction or impaction? If he has the retention of scybalous masses, the bowel gripped on something, one can accomplish a good deal by the use either of hyoscin or eserin plus enemas. In such cases as that we have been distinctly aided in 9 cases out of 10 by doing as follows: If the abdomen is much distended and there is vomiting, but no pain, we can give a few doses of eserin, say one-fortieth of the salicylate, every three hours for three doses, followed by an alum enema. If the patient is in great pain and the abdomen is not much distended we give $\frac{1}{100}$ grain of hyoscin, followed two hours later by the enema, and we have found in some cases we did not have to do an operation at the time, it

could be safely done later, or in some cases it was not needed at all. So that while I am distinctly opposed to delay, and while I think enemas are deceptive and that purgatives are harmful, I believe in this method of practice in cases where the diagnosis is obscure; and if any of you have had the experience I have had, you will find the diagnosis is obscure in many cases.

Dr. Haggard.—In answer to Dr. Royster, I would say about every case of intestinal obstruction I have ever seen die was originally diagnosticated as fecal impaction. I wish there was no such nomenclature. It is a rare condition that gives rise to symptoms that are going to prove fatal, even appendix cases, unless they have intestinal obstruction, and the real obstruction comes to the medical man who first sees these cases, and in the great majority of the cases he does not see them before fecal impaction has taken place. I believe it is extremely rare they give rise to serious symptoms. For that trouble, one of the best text-books advises the administration of liquid metallic mercury. The worst case I ever saw of intestinal obstruction was where the intestines were black and torn like wet blotting paper. In this case fecal impaction was diagnosticated and metallic mercury was administered. As we lifted up the intestine it tore across so that we could see the quicksilver run out. It is unnecessary to say that in this case "The silver chain was broken and the golden bowl was loosened."

Dr. J. M. T. Finney, of Baltimore.—The chair would like to add a word in reference to what was said by Dr. Mayo. I have had experience in using the appendix in cases of intestinal obstruction. In my experience it does all that Dr. Mayo says it does, and is a very valuable aid, especially in those cases where the obstruction is situated low down.

Let me utter a word of warning against the indiscriminate use of eserin, which may be followed by disastrous results. My attention was first called to this by Dr. Abel of the Pharmacological Laboratory at the Johns Hopkins, who said that eserin at times may have a marked depressing effect. Since he has called my attention to it I have been watching it closely, and have seen evidence of it in several cases. In one case especially it apparently had a very alarming effect. In one or two others its use was followed by definite symptoms of depression, and the withdrawal of it was followed by decided improvement in these cases.

Dr. Stone.—What was the dose used?

Dr. Finney.—I do not recall the exact dose, but I should say the usual dose. We have a routine which is followed in the hospital and the exact dosage used I do not know, but it was that which is ordinarily used.

Dr. Ernst Jonas.—In speaking of the danger of eserin, I wish to say that I had one case in which there was a marked depressing effect after two doses of $\frac{1}{60}$ grain of eserin. For a few hours it looked as though the patient might succumb, but she gradually recovered from the influence of the drug. The eserin was given after an operation for fibroid tumor of the uterus.

Dr. Finney.—Since the point has been raised I will try to quote the exact language Dr. Abel used to me on that occasion. He said, "You are using eserine as a routine, are you not?" I replied, "Yes." He said, "Well, some day you will have occasion to regret it because it is a dangerous drug. You may go a long time without seeing an individual who is susceptible to it, and then you will see a very marked depressing effect. It is uncertain in its action, and many of the effects which have been attributed to other things are probably the result of eserin." That is in substance the conversation of Dr. Abel, and in watching its effect carefully afterward, I have seen a number of cases where it seemed to bear out his remarks.

As to the question of intestinal fistula and spontaneous closure, my own feeling is this, that a fistula of the large bowel will usually close of itself, while a fistula of the small bowel will rarely close itself. I have had a curious experience in 2 cases, where I used the appendix in having the fistula close spontaneously in these two instances out of quite a number.

Dr. Guy LeRoy Hunner, of Baltimore.—As to the routine use of eserin at the Johns Hopkins, they use $\frac{1}{100}$ grain every hour up to two or three doses.

Dr. Stone.—I would not take the floor again in regard to this matter were it not for one thing, namely, the eminence of our President. When he says anything it is apt to have a decided effect upon an audience. I know of a well-established case, and you all know of such cases, where cocaine has had a similar effect to that claimed for eserin. I know of a case in Washington in which after having 15 minims of $\frac{8}{10}$ of 1 per cent. solution of cocaine injected near one of the roots of a tooth, produced the most alarming intoxication, and it

required the most strenuous exertion on the part of the dentist to resuscitate the patient. Are we going to lay aside an agent of such value as eserine because of what President Finney has said about it? I hope there is not a man here who would lay aside such a good thing as eserin, even though someone may report an unfavorable experience with the use of the drug.

Dr. Royster spoke of hyoscin, but there is no drug of greater value than eserin in the cases in which we have been considering its use. I think Dr. Craig, of Boston, performed a great service when he brought before the profession the value of this drug as an intestinal stimulant. There are times when many drugs have produced certain unexpected effects. For instance, we may have toxic results from a small dose of morphine. We never use a small dose of $\frac{1}{100}$ grain but give $\frac{1}{30}$ or $\frac{1}{40}$ grain, and I have never seen serious depression following this dose.

Dr. Rufus B. Hall, of Cincinnati.—I would like to emphasize the point made by Dr. Brown in reference to draining the intestine above the point of obstruction in those cases where it is thought best to resect at the time of the operation. Several years ago, at the Cincinnati meeting of the Mississippi Valley Medical Association he advocated the use of a device by which one can connect the upper part of the intestine onto a rubber tube and allow it to hang over a pan below the table and thus drain the upper part of the intestine. I adopted that plan in a number of cases, and my experience is that the intestine is usually well collapsed by the time you are ready to put in the other half of the button or any device you use in finishing the operation. It is rarely necessary to do anything toward emptying the upper part of the intestine when using this plan.

In a few cases I have found the method suggested by Dr. Moore and one or two of the other speakers useful, and in place of using a trocar, I have taken the trocar, attached it to an aspirator and turned it over to an assistant and he has emptied the contents of the gut into the aspirator bottle, subsequently closing the opening with a purse-string suture. By the time I was prepared to finish the intestine everything was ready to do so, without leaving an intestinal fistula.

I would like to emphasize what Dr. Stone has said about eserin. I was greatly impressed with the reports of it early in the history of the drug, and I used it in the slightly septic cases after a pus operation in the pelvis where it was difficult to get the bowels to move afterward. Almost as a routine I

use eserin in all the desperate cases. I have seen a number of cases in which there was depression following the use of eserin, and I use it usually in no larger doses than $\frac{1}{30}$ of a grain. I use it in $\frac{1}{30}$ of a grain the first dose, and if that does not start peristalsis and the patient complains, in the course of half an hour or three-quarters of an hour I follow with an additional dose of $\frac{1}{40}$ of a grain. It is rarely necessary to give a second dose. On two or three occasions I have seen depression, but not a depression that would alarm one. At any rate, the depression was not such that you felt that the patient was going to die like one does in cocaine poisoning. I have seen on two or three occasions small doses of cocaine given for minor operations where the patient was alarmingly ill and looked as though he was going to die. Of course, there may be a fatal outcome in some of these cases in which eserin is used in this condition, but are we going to discard a remedy that must necessarily save lots of these patients who would otherwise die because occasionally there are apparently bad results or effects following its use. I should say no.

Dr. Royster.—This is a very important subject. You cannot "argy agin a success." We have been giving eserin for seven years, not routinely, but we have been giving it in large and small doses to young and old people, and have never seen the slightest depression from it after having made some careful observations. We believe the depression which is reported to follow is due chiefly to the condition for which eserin is given, and not to the eserin itself.

In reply to Dr. Haggard I will say that I saw 3 cases opened last year for fecal impaction. The diagnosis was not made beforehand. The only thing we claim you should carefully determine is whether you have a condition which is operative or not. If it is an operative case, operate at once; if not, relieve the patient as best you can.

Dr. Randolph Winslow, of Baltimore.—I think we are going far afield from the subject under consideration. We have been discussing the therapeutic effect of eserin, whereas the discussion should be restricted to intestinal obstruction. Neither eserin nor any other drug is going to afford relief when the intestine is obstructed, and there is nothing to do any good but an operation, and it seems to me that we are not differentiating these cases as we should. When we speak of intestinal obstruction we mean something mechanical. What

is eserin good for? That is something I want to know, and it can only do good in cases in which the bowel is not mechanically obstructed. If there is anyone who knows about eserin and can tell us exactly what it can do, I will be very much obliged to him. I do not think an intussusception, or an intestine that has a band around it, or a strangulated hernia, or any of these various kinked conditions, is going to be benefited by the use of eserin or by anything short of operation.

Dr. Henry O. Marcy, of Boston.—I did not intend to say anything in this discussion. I have learned a good deal, and I quite agree with what Dr. Winslow has said. The surgeon must determine, in the first place, if the obstruction is mechanical or functional? If organic, something that is entirely beyond the limit of functional restoration, the point then to determine is, How early may we obtain this knowledge and when shall we operate? Shall we delay operation and allow auto-infection to go on to such a condition, as has been pointed out, that most of our patients die from it after operation. I am quite sure, the earlier an operation is made if necessary, the safer it is. I have lost patients from delay, and I thought I knew something about causes of intestinal obstruction in those days when patients were first under personal hospital observation. After having determined that the case is an operative one, the next question that arises is, How soon should you operate? And that is in my estimation the crux of the whole discussion.

Dr. Morris.—We must settle the question of eserin. It is somebody's fault when patients get killed. We have apparently brought out this morning the fact that a certain number of individuals show an idiosyncrasy to eserin as they do to cocaine. These patients are allergistic to eserin. These cases should be classified in one group. It seems right now we ought to have a report upon eserin to the effect that certain signs give evidence of allergy. We have it in regard to cocaine. We can tell quickly when patients are allergistic to cocaine. Let us have a good report right now showing who are allergistic to eserin.

Dr. J. Wesley Bovée, of Washington, D. C.—I did not intend to discuss this paper, but one of my pet hobbies has been touched on, and I would like to contribute the result of my experience in the use of eserin. Dr. Stone and I have been using eserin ever since Dr. Craig, of Boston, brought

out the value of its use in emptying the intestine. It is my routine treatment in every case after operation. It is very rarely any other remedy is used for the first bowel movement, whether the case is perfectly normal or otherwise. I give a hypodermic of $\frac{1}{40}$ grain, followed by a simple or a purgative enema. It never fails to give a bowel movement in a case in which there is no intestinal obstruction. I do not recall one case in which it did not. Therefore, I feel myself just as safe in the use of it in that manner, not in the large doses Dr. Royster spoke of, nor the small doses, but in that dose of $\frac{1}{40}$ grain hypodermically, which is a routine dose with us, and the one dose is in thirty minutes followed by a simple enema, or, if the indications are such as to warrant it, a stronger dose with a purgative enema, instead of a simple enema. The action of the eserin depends upon the assistance of the enema. If you do not give the enema just thirty minutes later very likely you will not get a bowel movement. Our results have been very satisfactory with the use of eserin.

Dr. Mayo.—I would like to ask Dr. Bovée when be begins the use of eserin after hysterectomy, and if he does not get an effect after using it once and following it in thirty minutes with an enema, when he would use it again?

Dr. Bovée.—Usually about three days after operation. It depends upon the distention of the abdomen with gas. If a patient suffers with painful distention of the abdomen I might use it six or fewer hours ofter operation. It depends upon that one particular symptom and I have never seen it fail. So I should be at a loss to know what I would do otherwise. I would have to devise some other means.

Dr. W. W. Crawford, of Hattiesburg, Miss.—In connection with what has been said in regard to the use of eserin, I will say that some very large doses of the drug have been given. Some of the medical journals during the current year have reported a case in which one patient was given 2 grains of eserin by mistake. The patient was made desperately sick, but recovered. One patient of whom I have personal knowledge was given $\frac{1}{2}$ grain of eserin, the patient became violently prostrated and had symptoms of cholera, and for two or three hours death seemed impending. However, she did not die. Another patient, a minister, and a very intelligent man, to whom I administered $\frac{1}{40}$ of a grain of eserin on the second or third day following an appendectomy has explained his experi-

ence with it in this way: He said he felt as though a stick of dyanamite had exploded within him.

I think the great question is not that we shall begin with $\frac{1}{30}$ grain as suggested, but rather that we shall appreciate the fact that there are many people who have an idiosyncrasy to eserin, and therefore, we should always begin with a small dose, say $\frac{1}{50}$ of a grain, and repeat it as often as is necessary. The experiences that have been cited are instructive to us. The enema suggested in connection with eserin adds very materially to the effect of the drug.

Dr. Bloodgood.—Our observation has been this, and I think it is probably true in the practice of others, as well as in the use of other drugs, that if there is any indication for the drug there is less danger in its administration. People in great pain will stand larger doses of the drug given to afford relief. If the drug is given in a small dose, you can always repeat it, while if you give large doses, you cannot take any back. Eserin is not a drug to be used as a routine after operation, but in certain postoperative cases where there is difficulty in getting gas out of the bowel, it is helpful, and if one dose is given and that dose carefully watched, and then a second dose given if the first dose does not produce an effect, I do not believe there is much danger. If each dose is carefully observed I doubt if there will be any danger, and the most important point Dr. Finney brought out is its indiscriminate use in a routine manner, and if these patients are watched closely you will observe that some of them collapse. I do not think the dangers of the drug, if it is carefully watched are at all sufficient to justify its not being used.

Dr. Gordon K. Dickinson, of Jersey City.—In cases of intestinal obstruction we have toxemia with collapse. Diagnosis is so fallacious that to wait until it is definitely made would be to wait too late. We must get in, tap the gut, give saline solution subcutaneously, and fill the lymphatics, with such subsequent treatment along that line as may be deemed necessary.

With regard to intestinal paresis, I have stopped the use of eserin and am using Kemp's tube. It stimulates peristaltic action and is efficacious.

Dr. Finney.—Dr. Winslow's point is well taken. Much of the discussion is not germane to the subject. The chair wants to call attention to a possible misapprehension. He

wanted to raise his voice in protest against the abuse of eserin rather than the use of it.

We have with us today Dr. Milne of the London Hospital, England, and I would like to ask him to give us his experience in the use of eserin on the other side of the water.

Dr. Robert Milne, of London, (by invitation).—In the first place, I want to relieve my surgical colleagues of the blame that in giving patients enemas we constantly use anesthetics.

With regard to the use of eserin, I may say that (1) we would never think of giving eserin to a patient with intestinal obstruction before the gut had been opened above the obstruction; (2) with regard to using it in the after-treatment, in coming to this country I have admired constantly the skill of your surgeon, but what I have learned from this discussion this morning is the immense hardihood of the American nation as a whole. Any nation that gives 2 grains or $\frac{1}{40}$ grain of eserin at a dose is going to forge ahead. A couple of years ago it was very fashionable in the London hospital to use eserin, but now it is only the extreme cases of distention of the abdomen that respond to the use of eserin. We were not allowed to give a dose of more than $\frac{1}{100}$ grain, and not more than three such doses. I cannot say that we have noticed any particular collapse. The patients that have collapsed have died of intestinal obstruction either during or after operation, but what I have found is that the eserin has acted so well you cannot stop it. Without exception all the patients I have seen to whom eserin was given have had diarrhea. They scored double figures on the chart each half day. Six months ago in preference to eserin we started to give our patients stovain intraspinally. Both of these drugs act by giving off nerve impulses, and we found these intraspinal injections were safer and quite as efficacious as injections of eserin. While I am on my feet, I might add a word in regard to the treatment of these cases. We wash out the stomach, as you have insisted upon, before operation, but if we give these patients a general anesthetic, we think it is very important to leave the stomach tube in during the whole operation. Personally, I have seen a bucket half full of this dirty, stinking material after the operation, which has come up through the stomach tube, and mind you, there has not been any straining or difficulty with the anesthetic. This stuff has come up the

stomach tube, so that one would think the patient was emptying his bowels through the mouth.

With regard to enema, if there is a time before operation, we like to give the patient two enemas. The first is to wash out any fecal material that may be in the lower bowel; the second is given by an experienced nurse, and if that enema comes back with no force, no feces, no flatus, then we are absolutely certain that the patient has organic intestinal obstruction.

With regard to the bowel after operation, most of the English surgeons feel if you operate upon a case of intestinal obstruction and send the patient off the table with the intestines distended, you have not done your duty, and we empty them either by what we call a tube or by multiple injections, injecting a concentrated warm salt solution.

Dr. O. H. Elbrecht, of St. Louis.—With regard to the use of eserin, I would like to add something to what has already been said in regard to it. It seems the dosage has been the principal subject of discussion, and my purpose in relating my experience is to show the effect of eserin on the normal individual. At the time when I first began to use it the dosage was far more uncertain than it is today. I observed with a great deal of interest that horse doctors used it years ago and continue to use it for what is known as wind colic, and wind colic is nothing but peritonitis. They use 1 grain of eserin. Now, the relative dose between a horse and human being is supposed to be $\frac{1}{20}$. Taking that as a standard or as a unit, we worked along that line on some normal individuals to find out the effect from the different doses as administered to different individuals. We started in with $\frac{1}{100}$ grain. The tablets on the market today are made up in $\frac{1}{75}$ or $\frac{1}{50}$. I had tablets made up of $\frac{1}{20}$, $\frac{1}{30}$, $\frac{1}{40}$, but as a standard we used $\frac{1}{50}$. We worked upon this dosage, and I admit with some reluctance, that we gave 5 patients $\frac{1}{20}$, and in these doses the patients, some of them, reacted promptly, while others showed no reaction. For instance, patients with leg ulcers were given eserin with a view to determining whether or not they were getting any of the relative dose of eserin. Three of the patients went into a typical collapse, with sweating, pulse feeble, but responded within a few hours, and were all right. The dose we came down to is now $\frac{1}{30}$, given a single time. If that does not do it, we find we cannot get the reaction with any other

dose. I have found a dose of $\frac{1}{100}$ of no service, where eserin is indicated, and you cannot get a result with the ordinary enema, having failed with the other things. It is less risky and where you want to get bowel action, one good dose is sufficient to give it. If you work on small doses you will lose valuable time and probably will not get action. We found small doses in normal individuals had absolutely no effect; whereas larger doses in some instances gave prompt action of the bowels, and we found it was usually from twenty minutes to half an hour before it acted.

Dr. McGlannan (closing).—With reference to the safety of immediate enterostomy, in no case where peritonitis was the cause of death did it follow immediate enterostomy in these 181 cases.

As to the use of castor oil and eserin in diagnosis, as recommended in cases where diagnosis is doubtful, where a previously administered purgative or enema has been ineffectual, and still leaves the patient with uncertain symptoms on which one would hesitate to operate. In those cases we recommend, if the patient is in a hospital ready for operation and the emergency arises, that the stomach be washed out, that castor oil be given, and the $\frac{1}{32}$ grain of eserin be administered hypodermically. It is given for diagnostic purposes. In passing, I will say the therapeutic dose of eserin has been $\frac{1}{64}$ grain, and because of the possibility of syncope we have administered it with $\frac{1}{60}$ grain of strychnine in the after-treatment of abdominal operations. The back flow from the lavage is diagnostic in postoperative cases only when we know the intestine has been emptied at the time of the operation.

As to methods for determining the location of the obstruction, the consideration of them was purposely avoided because I felt that in cases of acute intestinal obstruction the exact location is the least important part. We must make a large incision so as to be able to do whatever is required to relieve the obstruction when operating in the first stage. In the late cases with toxemia, the position of the obstruction is unimportant, because all we do is to relieve the toxemia, by enterostomy.

As to the relation of enemas to purgatives our experience with enemas is, they are less dangerous out of the hospital. I remember one patient on whom I operated who had been seen by two consultants, both of whom ordered drastic pur-

gatives. The point I want to make is this, that in the early diagnosis of obstruction the factors to be borne in mind are the use of the stomach-tube, the use of enemas, and if with the combined use of the stomach-tube and enema you do not relieve the pain and constipation, there is no other course but to operate. In the late cases, where the patient is already toxic, the most important part of the operation is the emptying of the distended bowel.

PANCREATIC CYSTS: REPORT OF A CASE

By Lomax Gwathmey, M.D.
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True cystomata of the pancreas, of very large size and capable of complete removal, are of sufficient rarity to warrant a report of the case, which is the subject matter of this communication.

Cysts located in the tail of the pancreas, as was this one, are occasionally entirely removable, while those of the body are most infrequently so, recourse to drainage or partial removal with drainage being the usual operative resort. The latter procedure is not eminently satisfactory as evidenced by tedious convalescence, persistence of sinuses, recurrence of cyst formation and other undesirable courses in the recorded cases, therefore the technique which permitted complete removal in this case may, perhaps, be of interest. The peculiarly symptom-free course of this tumor is quite analogous to some of the ovarian cysts, which disturb only by their physical presence; the patient in this instance having apparently grown up with the tumor and gradually adapted herself to its constantly enlarging dimensions. In fact the cyst was removed incidentally to an appendectomy, the patient readily submitting when the nature and probable cause of the growth was explained to her. While we frequently see cysts and some solid tumors of the lower abdomen causing but few symptoms, usually a tumor the size of the full-term uterus in the upper abdomen causes considerable disturbance.

Cysts of the pancreas are true and false or pseudocysts. Of the former there are two varieties: Retention cysts and proliferative cysts; of the latter but one, known as the apoplectic cyst. I trust we may be pardoned a brief recapitulation of their characteristics.

1. Retention Cysts. Retention cysts are caused by some obstruction to the outflow of the pancreatic secretion. Senn thinks the hindrance to absorption, due either to changes in the pancreatic juice or to changes in the absorbing power of the vessels, a more important etiologic factor in the formation of a cyst than an obstruction to the outflow of pancreatic secretion. The occlusion of the pancreatic duct is not always followed by the development of a cyst, nor can an obstruction be demonstrated in all cases of retention cysts. Lessened absorption undoubtedly plays an important part, but the most important etiologic factor in the formation of a cyst is an obstruction. This obstruction may be due to chronic indurative pancreatitis, neoplasm of the pancreas, pressure from without, an impacted gall-stone, or concretion in the duct of Wirsung.

Retention cysts vary in size from a comparatively slight dilation of the duct to a tumor containing twenty litres or more; may be single, due to distension of the duct of Wirsung (Ranula pancreatica of Virchow), or may be multiple, due to distension of the duct of Wirsung and its collaterals (acne pancreatica). Retention cysts are epithelial lined. The epithelial lining is usually a single layer of columnar cells. Occasionally, however, the epithelial layer may be many cells in thickness. The wall of the cyst is made up of dense vascular fibrous tissue, in which is often imbedded pancreatic parenchyma.

2. Proliferative Cysts. This type of cyst is quite unusual. Fitz was able to collect nine cases from the literature. They may represent a true primary cystic degeneration of the pancreas, similar to that found in the mammary gland, or they may be regarded as cyst formation

in tumors. Opie states that "The occurrence of multilocular cysts of the pancreas, the presence of numerous small cysts in the wall of the large cyst, the presence of papillary projections upon the inner surface may be regarded as evidence that cysts may be formed by the proliferation of epithelial tissue of the gland." Proliferative cysts resemble cyst adenoma of the ovaries and they are to be looked upon as border-line tumors, as there is not always a sharp distinction between them and malignant growths. Hartman described a cystic epithelioma attached to the tail of the pancreas accompanied by extensive metastasis to the liver. Multilocular cysts show great variety of sizes, have thin walls and epithelial lining. The epithelial lining consists of a single or many layers of columnar cells. These cells frequently break through the basement membrane and invade the wall of the cyst.

3. Apoplectic Cysts or Pseudocysts. Apoplectic cysts, arising secondarily from hemorrhages, should be distinguished from hemorrhagic cysts due to a hemorrhage in a preformed cyst. An apoplectic cyst usually follows an injury, such as a blow over the pancreas, etc., or it may follow acute hemorrhagic pancreatitis. It is readily apparent that blood and even pancreatic secretion might be present in a pseudocyst, as a result of a laceration of a portion of the pancreas at the time of injury. There seems to be considerable difference of opinion whether or not cysts can develop secondarily from a hemorrhage. Orth, Senn, and Nimier believe that cysts may be so formed, while on the other hand Tilger states that no convincing proof has ever been given for the existence of an apoplectic cyst. Loyd believes that the so-called pancreatic cysts of traumatic origin are collections of fluid in the omental bursa, the result of localized inflammation of this portion of the peritoneum. However this may be, Littlewood's case, as cited by Nimier, would indicate that an apoplectic cyst is something more than a possibility.

Apoplectic cysts are located about the pancreas, most often in the lesser peritoneal cavity. They may, however, be attached to the pancreas. They vary in size, as do retention and proliferative cysts. The cyst wall is made up of vascular fibrous tissue and it is not lined by epithelium. The ferments may be the same as those found in other cysts of the pancreas.

Cyst Contents. The contents may be clear, but usually are more or less turbid, gelatinous, colloid or purulent. The color of the fluid content is due, in large measure, to altered blood pigment but not necessarily so. The color may be light straw, yellow, yellow green, brown, chocolate brown, reddish brown, and coffee ground. The reaction is usually alkaline, although in Bozeman's case it was acid, and in the cases of Kramer, Hersche, and Wolfe it was neutral. Albumin content varies 0.5 per cent. to 10 per cent. Traces of sugar, cholesterin, leucin, and tyrosin have been met with quite frequently but not constantly. All of the pancreatic ferments are seldom found. In the cases of Richardson, Littlewood, and others all were present, while in the cases of Witzel, Brown, Steele, and Richardson all were absent. There is some divergence of opinion as to the importance the pancreatic ferments play in the diagnosis of pancreatic cysts. Oser states that the presence of trypsin is sufficient to warrant a diagnosis of pancreatic cyst. On the other hand, Opie claims that "The presence in cystic contents of one or more ferments resembling those of the pancreas was formerly believed to give sufficient proof that a cyst had its origin in the pancreas. Not infrequently one, or perhaps all, of these enzymes are absent in the contents of a pancreatic cyst, whereas fat-splitting, diastatic or proteolytic enzymes are found in the fluid not derived from the pancreas."

The pathological report of our case, which is here incorporated, classifies the tumor as a true proliferative pancreatic cystoma. A tumor about the size of a pregnant uterus

was brought to the laboratory one hour after removal, with the diagnosis of a pancreatic cyst. The cyst had been torn in the removal and about one-half of the fluid escaped from it. This was collected and measured separately. The total amount of fluid was about six quarts.

The cyst had an oval shape which was interrupted by smaller cysts, varying in size from a walnut to an orange. The outer wall was comparatively smooth although there were a few fibrous tags attached to it. The inner wall was smooth and glistening. There were a number of papillary projections which proved to be small cysts. In the most dependent portion of the cyst a reddish-brown precipitate had settled. This sediment was about 0.5 cm. in thickness and was made up of altered blood. On puncturing the smaller cysts a colloid material escaped. Small cysts showed numerous papillary projections which proved to be still smaller cysts. Wall in large cyst about 2 mm. in thickness, in the smaller cysts from tissue paper to 1 mm. in thickness.

Microscopic. Cyst wall made up of dense vascular fibrous tissue in which was imbedded some remains of pancreatic parenchyma and also numerous small cysts. The smaller cysts were lined by epithelium, the large cyst showed no epithelium. The epithelial lining in some instances consisted of a single layer of columnar cells, and in other instances many layers of cells of the columnar type. In certain areas the epithelium had broken through the basement membrane and had invaded the cyst wall. Scattered throughout the wall of the cyst were little islands of epithelium quite remote from a smaller cyst.

Fluid. Chocolate brown in the large cyts, colloid in the smaller cysts. Specific gravity in both, 1.016. Reaction, alkaline in both. Protein in large cyst, 3 per cent.; in the smaller cysts, 1 per cent. No bile, sugar, cholesterin, tyrosin or leucin. Both large and small cysts showed the presence of all three ferments. Occult blood test faintly positive in contents of large cyst.

1. Proteolytic (Trypsin). Small piece of fibrin placed in 10 c.c. of cyst content and incubated for twenty-four hours. Total digestion followed.

2. Lipolytic (Lipase). Five drops of an emulsion (10 parts olive oil, 5 parts gum acacia, and 25 parts water) added to 10 c.c. neutral litmus solution. To the tubes 2, 4, 8, 16, 32 mm. of cyst content also added and the tubes were then placed in water bath at 37° C. for one-half hour. No change in 2 and 4, decided red color in 8, 16, and 32.

3. *Diastatic* (*Diastase*). 1 c.c. thin starch paste to which was added 5, 10, and 15 mm. of cyst content. Tubes placed in incubator for twenty-four hours. Contents of each tube reduced (Fehling).

Microscopic. Fluid content from large cyst showed considerable detritus, few degenerated epithelial cells and leukocytes, no cholesterin crystals. Small cyst showed a few degenerated epithelial cells. Attempts to culture an organism from cyst contents were futile.

The cyst presents one or two interesting features which it would be well to emphasize. The fluid, if you remember, in the large cyst was entirely different from the fluid in the smaller cysts, the difference being due to a hemorrhage or hemorrhages that took place in large cyst. The smaller cysts were lined by epithelium, while in the large cyst not a vestige of epithelium could be found. The large cyst was evidently lined by epithelium but this epithelium must have suffered autodigestion. The cyst was at one time, we think, uniformly colloid. A hemorrhage or hemorrhages took place in the large cyst which caused the difference in cyst contents, and which caused some trauma to the epithelium of cyst wall, thereby allowing the ferments in cyst contents to digest the epithelial lining.

History of Patient. Miss H. M., aged thirty-two years; single; travelling saleswoman. Referred by Dr. H. S. Baker.

Complaint. (1) Pain in abdomen, and (2) tumor in the upper abdomen.

Family History. Unimportant.

Personal History. Always healthy. Usual diseases of childhood. Typhoid seventeen years ago. No complications or sequelæ. No other severe sickness.

Since childhood she has suffered with what she calls bilious attacks. Attacks periodic, coming on at intervals of one or two months, usually lasting a day or so, and clearing up very quickly with calomel. Attacks characterized by constipation, slight jaundice, coated tongue. No pain, fever, malaria or urinary disturbance.

Present Illness. Christmas, 1911, she was seized with a violent pain in lower portion of abdomen. Pain intermittent, lancinating in character, and did not radiate. Chief seat of pain was over the appendix region. Patient had at this time a degree or two of fever. No constipation, jaundice or urinary symptoms. She was seen by a physician, and pain was relieved by hypodermic. In two days she was able to resume her duties. Patient has had two similar attacks since the first attack on Christmas day, one in February and another on admission. Patient has noticed fulness in upper abdomen since early childhood. Mass caused no inconvenience except for interference with corset and dress. Never any pain in region of mass. Mass did not increase in size after the attacks of what she styles "appendicitis."

Present Examination. Patient is a large, fairly well-nourished woman, apparently in considerable pain. Pulse, 110; temperature, 100°. Examination of her head, neck, thorax, heart and lungs, glandular system, and extremities proved to be negative.

There was a decided fulness on left side, which extended well past the mid-line toward the right and also into left pelvis and under left ribs. Mass fluctuant and there was no apparent motion on deep respiration. Percussion note dull. Stomach and colon not inflated because of severe pain. Pain in right iliac fossa, with its maximum intensity at McBurney's point.

Blood pressure, 128.

Red blood cells, 4,700,000; white blood cells, 9000.

Differential polymorphonuclear, 68; small mononuclear, 14; large mononuclear, 12; eosinophiles, 2; transitional, 1; unclassified, 1.

Urine negative.

Stool natural looking. No parasites or ova. Muscles fibers well digested; no evidence of steatorrhea.

The diagnosis rapidly eliminated all but two conditions, hydatid and pancreatic cysts. The absence of thrill and the extension up under the diaphragm and down to the left flank determined the correct condition.

A free incision through the left rectus exposed the tumor, which was free on its front aspect but overlaid in part with omental adhesions. The tumor was aspirated of several quarts of dark brown fluid and an attempt at its enucleation was begun. The large posterior portion with its abundant bloodvessels was found ineradicable without undue jeopardy to the colonic blood supply. The cyst was therefore attacked from within, and by a careful dissection its wall and numerous daughter cysts were removed intact and complete. There were two large arterial trunks entering its base, besides numerous small arteries and the usual large venous sinuses. After ligation (hemostasis) the large bared area was layered in by catgut sutures and the peritoneal rent closed.

So lax was the abdominal wall after the tumor's removal that the appendix was removed without difficulty through the same incision. It contained an extremely large appendolith in the tip, and was actively inflamed. Old and fresh adhesions in the pelvis were broken up, adherent coils of small intestine removed from the cul-de-sac, and sigmoid properly placed in the pelvis. The kidneys, liver, gallbladder, and ducts, the pancreatic head and other abdominal organs were found normal. The wound was closed without drainage. The convalescence was smooth and uneventful,

and the patient left the hospital in nineteen days to go to her home in Chicago. A recent letter, six months since her operation, reports her in excellent health, much better than she had ever before experienced.

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DISCUSSION

Dr. I. S. Stone, of Washington, D. C.—I wish Dr. Gwathmey would tell us in closing the discussion the exact size and condition of the pancreas that was allowed to remain; whether it was normal in appearance.

Dr. Randolph Winslow.—Did you say you removed several gallons or quarts of fluid?

Dr. Gwathmey.—About six or eight quarts.

Dr. Rufus B. Hall, of Cincinnati.—The Doctor in this paper emphasized the difficulties in removing these cysts. Of course, in his case the logical operation would be to remove the cyst, the multilocular condition, but he had his difficulties in the enucleation in controlling hemorrhage.

I reported to this Association several years ago an operation for pancreatic cyst. In that case the cyst was large and evidently came from a trauma. The man was lifting and injured himself, and he came to operation for this cyst five or six months after the injury, with his abdomen enormously distended, holding more than two and a half gallons of fluid. The operation was simple, namely, draining the cyst and stitching the cyst to the abdominal wall.

I also reported to the Association several years ago a case with a history similar to the one reported here of a woman carrying a tumor which was diagnosticated by her physician as ovarian, because it was first discovered after the delivery of one of her children. I was assured that it was her fourth child which she had borne, and she had a little inflammation in her abdomen following that delivery. She promised to be operated on when she got well. She was the wife of a farmer and after her recovery she concluded she would not undergo operation, and she went on for a couple of years more and bore a second child, had a similar inflammatory trouble following her confinement, from which she recovered. The tumor was still believed to be ovarian, and was about the size of a child's head. She had borne a third child, after which time she became infected and the tumor likewise became infected. She came to operation four or five months after the delivery of the third child in a desperate condition from infection. In that case I removed the cyst wall. The abdomen was the size of that of a woman six or seven months pregnant. I believed at the

time, until I was far along in the operation, it was an ovarian cyst. But I removed the cyst and she recovered. The point I wish to make is the clinical history preceding the infection of her tumor shows that with this tumor annoying her it was not serious enough to demand relief by an operation for its removal. In that instance there was a portion of the pancreas left. It was evident at the time of the operation. The cyst holding a gallon or more of pus. She has since borne one child. She is well now, and I understand has passed the menopause, and is a perfectly normal woman.

Since my report to this Association of a previous pancreatic cyst, I have operated on another case of pancreatic cyst, in which the cyst was drained, and the patient made a nice recovery.

Dr. Henry O. Marcy, of Boston.—I would like to have Dr. Gwathmey tell us in reference to the ligation of the arteries in this case.

Dr. Joseph Ransohoff, of Cincinnati.—I have had 5 cases of pancreatic cyst that I can recall. In the first case the cyst wall was destroyed. The cyst was drained, and the patient suffered always for days at a time when drainage ceased. Then when drainage recurred the pain disappeared, and finally a little stone came through the drainage wound and the patient got well.

In the second case I made nearly total excision of the cyst. In this case the tumor was enormous, and I am quite sure that case was reported in the *Annals of Surgery*. In that case recurrence took place two years afterward, and the patient died from malignant disease.

In a third case the cyst was drained. It also was supposed to be a non-malignant cyst of the pancreas, and the patient died. I would like to ask the essayist whether he is at the end of his case.

The last one is the most interesting of them all, and it is that of a man aged about fifty years, who for two or three years has been suffering intensely with pain in the region of the epigastrium. It looks as though he might have gall-stones. the patient was very much reduced in weight because of the pain and he had become a morphine taker. A tumor could be felt in the epigastrium which could be mapped out as above the lesser curvature. *X*-ray showed the tumor to be in relation to the pancreas, the stomach with the lesser curvature to the

left, and the lesser curvature perpendicular. The entire tumor was not larger than a cyst, the man was very thin, so that the tumor could be easily palpated. Examination of the stools was made with care by a stomach specialist and found negative. The operation revealed a cyst of the pancreas which contained 5 or 6 ounces of grumous fluid, such as we find in hemorrhagic cysts. I believed it to be that from the appearance of the fluid when it was removed. When I introduced my finger into the cyst the ducts were so distinctly dilated that they felt like the metallic case of a thermometer. I could feel the ducts at the bottom of the cyst. This cyst was undoubtedly connected with the pancreas. Examinations made of the contents were absolutely negative. As to the chemistry, it did not have digestive properties. I did not take out the base of the cyst, but simply drained, and for two or three weeks drainage contined. The man still has pains. I am somewhat in doubt as to what is the matter with him. Was it simply a dilatation of the pancreatic duct? That I cannot believe because the pancreatic duct, like the hepatic duct, is not a distensible thing. You cannot distend the duct of Wirsung. The pancreas was distinctly hard, with the duct dilated to the size of a lead pencil. The man continues to have intense pain for the relief of which he takes morphine, I suggested that drainage of the gall-bladder would relieve the chronic pancreatitis. What is the matter with this man? Is it simply a chronic pancreatitis with a cyst forming, as it possibly stands somewhere at the mouth of the duct of Wirsung? Has he something there around the diverticulum of Vater? Has he malignant disease or chronic pancreatitis? There is no tumor observable now.[1]

Dr. Gwathmey (closing).—The very fact that Dr. Ransohoff has brought out shows that drainage is unsatisfactory. As far as I could find in looking up the literature, these cysts develop into very large ones. They seem to be really pancreatic cysts and very rarely seem to be true cystomas. Nearly all of them would appear to be pseudocysts. These are incapable of eradication and must be drained, but the patients all get well. Patients with true cysts of the pancreas do not get well from simple drainage. That is an important point. If it is possible, such cysts ought to be eradicated. These cases

[1] This man has since died with all the symptoms of pancreatic cancer.

technically are difficult to deal with on account of the broad and very extensive base of the cyst, and to attack it from the outside as we ordinarily would a tumor, seems almost hopeless, but by using the hand within and gradually dissecting on the hand, with ligation of the vessels, we were able ultimately to get it all out and remove the cyst wall completely. The pancreatic arteries had evidently undergone a tremendous enlargement because there were several trunks quite as large as the splenic artery, which is unusual at this site. In answer to Dr. Stone's question, perhaps one-fourth of the pancreas was involved. The head of the pancreas seems quite normal, and we were able to close up by suturing the small end of the pancreas. We do not know whether these true cystomas, or unquestioned border-line tumors, are malignant or not. One or two cases reported have shown metastatic malignancy. A long duration, with a very complete eradication of the wall, would lead us to hope for a good prognosis in this case. That cysts do occur in the pancreas sometimes from stoppage, and sometimes not, may possibly be explained by the patent duct of Santorini. The duct of Wirsung may be stopped and the pancreas not become cystic, but if it does become cystic, then it is evident that one of the ducts of Santorini is stopped.

INCREASE OF NEWER ABDOMINAL SURGERY DUE TO INCREASE IN TOXIC DISTURBANCES

By Robert T. Morris, M.D.
New York City

Some years ago Byron Robinson gave us a very good description of certain groups of peritoneal adhesions. I think most of us overlooked what Robinson wrote at that time, and his explanation for the presence of certain groups of adhesions did not quite appeal to us. He said that in the sigmoid region and in the region of the cecum and about the pylorus we had more peritoneal adhesions than in any other part of the peritoneal cavity excepting in the pelvis in woman. He ascribed the frequency of adhesions in the cecal region and sigmoid region to the same causes—mechanical, traumatic—and believed that the injury was caused by the action of the psoas muscle, and in demonstration of that point he asked us to have our patient flex the leg in such a way that we could feel the psoas muscle rising and striking the cecum and sigmoid. The psoas muscle does rise and strike the sigmoid region and cecum, and that seemed to be a plausible reason. But he left out the explanation for the presence of adhesions in the attic of the abdomen (cobwebs up in the attic of the abdomen). We know now that all these adhesions belong to a common category—they belong to the toxic group of manifestations—and we are learning a great deal about how this toxic impression leads to adhesion formation in cases without

acute inflammatory onset. We know that in some instances bacteria penetrate the wall of the bowel. We know that endothelium is shed as a result of their presence, and we know that exuded lymph becomes organized and forms permanent adhesions that are common in the region of the cecum, largely in the region of the sigmoid and largely in the region of the pylorus and bile tract. The reason for this we have to work out. I presume that we shall find especial anatomy referring to the lymphatics of this region which will explain the frequency of the penetration of these regions by bowel bacteria.

At present I am making a study of a series of cases with a view to determining in what proportion we find the bacteria in these low-grade adhesion tissues which are not the result of acute inflammatory onset. I sometimes find old colon bacilli enmeshed in old adhesion tissue just as we find old colon bacilli in the centre of gall-stones; this factor we must consider when the problem is to be subjected to analysis.

Now we pass on to another related question—namely, Why are we having more of abdominal surgery relating to Lane's kink, relating to Jackson's membrane, relating to cobwebs in the attic of the abdomen, than we ever had before? For the answer let us turn to the statistics which are being collected by the Equitable Life Assurance Association of New York. The Equitable Life Assurance Association maintains a staff which has for its function the determining of the causes of death, and when there is any increase in any one cause for death a study is made of this subject. They find a rapid increase in insanity. The Equitable people are finding a rapid increase in the cases of arteriosclerosis. They are finding a rapid increase in the large number of cases which belong to the stage of decadence. That is rather close to our subject, I believe, for when we have arrested development as a result of the decadent change now taking place in all of the civilized

nations in our present cultural period we find that physical defects, stigmas which are commonly classified as such, are much in evidence; they are increasingly in evidence, particularly the common stigmas classified by the psychiatrists. We have to assume that along with these defects in construction which are classifiable, we have defective protective organs—the ductless glands for instance. These ductless glands, which maintain control over the process of digestion over the processes of metabolism, apparently lose part of their efficiency, due to defective structure, and it is this defective structure of the ductless glands, largely of the adrenal group, if you please, or the chromaffin group, as a whole, playing their part in the history of the decadent stage of our cultural period. We are getting less protection against the microbes and against the toxic impression made by their products. We are losing then a certain part of protective efficiency against the great enemy to all organic life—the microbe. We are losing digestive efficiency because of the defective ductless glands which are not producing enough secretion to give us the proper hormones which send messages to the secreting glands, consequently there is intestinal fermentation, allowing a larger number of toxins to be secreted and developed and producing their influence in oversensitizing the plasm of all cells. The plasm of sex cells and the plasm of soma cells are equally injured by the microbe. The toxins produce their effects in an increasing proportion as we lose the efficiency of our ductless glands. All this, I believe, is part of the general tendency at the present time toward arrested development of the various structures.

It seems to me in studying the question of Jackson's membrane, Lane's kink, attic adhesions, we have to consider the amount of new colonic surgery that is being done. We must go back to the fundamental point of knowing what proportion of our newer surgery is due to defective metabolism, dependent upon defective protective ductless glands.

What are we going to do about it? That question resolves itself into two kinds of classification: (1) Surgery helps, but we are only relieving the symptoms. The surgery which throws a large part of the colon (which carries most of these toxins) out of commission has the effect of relieving many of the secondary disturbances, such as hyperthyroidism, manic-depressive insanity, or mysticism. We do not know how many of the psychoses and neuroses of the purely toxic group are being relieved—not cured, but almost cured—by throwing out of commission that part of the colon which is carrying the toxins which are oversensitizing the plasm of our cells. Surgery, then, has its place in a number of neurotic and neurasthenic cases. We are to look to surgery to help us very much in this fundamental part of the question. (2) Another part of the question relates to better development of individuals in the race. This question is one which is not under our control as surgeons, but belongs to the physiologist. It belongs farther back, in fact to the eugenist, and so it seems to me, as surgeons, we are not directly obliged to consider or to take part in the subject which relates to better development. It belongs to the eugenist; but the part which surgery incidentally has to play is a very important one. The demand for this surgery is to increase, requiring a higher degree of skill on the part of surgeons decade after decade. Men who are more alert and better able to analyze cases than we have been before will be required. There will be more cases of Jackson's membrane, more cases of Lane's kink, and more attic adhesions to deal with than ever before; and I believe this will be due to the increasing toxic impression belonging to the decadent stage of our present cultural period. The eugenist is the only one whose hand on the tiller can bring us up into the wind and start the race on another course.

DISCUSSION

Dr. J. Shelton Horsley, of Richmond, Va.—I think all of us are very much interested in this subject, because, as Dr. Morris says, it touches almost all of the abdominal surgery that is not acute surgery. We know, for instance, that this toxic product is not a septic product in the sense of coming from germs but from some faulty metabolism. It is difficult to recognize the pathology when we know so little about the physiology. For instance, Howell says we do not know what becomes of proteids. Some claim they are absorbed as peptones, also as polypeptids and amido-acids. But these things injected into the blood do not sustain life. Nutrient enemas, too, are capable of sustaining absorption nutrition for a time. We find there is a specific toxin for liver cells, another one for kidney cells, another one for the thyroid, and other toxins that act on many organs at once, yet few of them have been isolated. Until the chemist and physiologist work out the physiology we are hopeless in the pathology except to go on general principles. The toxic principles which form around the cecum and cause Lane's kink and Jackson's membrane are probably due to faulty metabolism and are most likely allied to toxic products which, when absorbed through the portal circulation, caused disturbances about the gall-bladder. If a small amount of this toxic material is allowed to stand in the gall-bladder for a long time it is more irritating to the gall-bladder than it would be to the ducts while passing through them intermittently. For this reason these products of faulty metabolism are not strong enough to cause a very marked effect on the ducts, but because of the fact that they accumulate and stagnate in the gall-bladder, initiate an irritation which is not truly septic, but may give rise to gall-stones or adhesions.

Dr. Henry T. Byford, of Chicago.—I would like to look at this subject from the other side. Dr. Morris says that the ductless glands are becoming more inefficient and that in the future we are going to have more trouble with the colon and more operations for Lane's kink, etc. This seems to me a singular way of looking at things by men whose business it is to lessen such disturbances or troubles. We are developing in civilization and are being crowded together in cities and towns; causes are now working in this country to interfere

with metabolism that were not working to the same extent formerly. Our foods are preserved instead of fresh, complicated instead of simple, and our activities are being transferred from the general muscular system to the stomach and brain. The muscles are underworked, the stomach and brain overworked. It is not that metabolism and other functions of the ductless glands are decreasing, but that we are demanding more of them. Nature is doing her best, but it will take many years for her to catch up with our artificial methods of living. The ductless gland will take care of itself if we will take care of ourselves.

Dr. Charles E. Caldwell, of Cincinnati.—Dr. Morris never comes before the Society without giving some new food for thought. A few years ago I remember he spoke of the era of physiological surgery. Now we have gotten into the era of surgical transcendentalism. This is very interesting. I do not say this in any way uncomplimentary to Dr. Morris. He has taken us back, to a certain extent, to the old age of philosophical medicine, and we are beginning to realize that we can be something more than surgeons. I have thought along these lines for many years, but I was not able to formulate my ideas as Dr. Morris formulates his; but at the same time I have thought along these lines, being essentially an evolutionist, and I believe that a great many of the things we have to contend with today are nothing more nor less than failure of the *genus homo* to adjust himself to the ever-increasing demands upon his higher nervous organization, and for that reason many of these things we are inclined to look upon anatomically of very great significance; but when we come right down to the kernel of the thing, they do not amount to a hill of beans. It does not make a particle of difference whether a man has Jackson's veil or not. People get along with Jackson's veil from the cradle to the grave, and go there without knowing it. I teach surgical anatomy. I had a case a year and a half ago of a negro on my dissecting table who had within two inches of the cecum, not a Lane's kink, not a Jackson's veil, but distinctly an ileosacral ligament, with no meso-ileum at all, and the ileum bound down with this distinct anatomical ligament to the sacrum. What we want to know is, How many of these things occur without causing any physiological disturbance and how many of these cause physiological disturbance because the patient is a physical and nervous

degenerate? We have retrograded. We have to go back to nature, *mens sana in corpore sano,* and the farmer who tills the soil, perhaps very poorly, does not evince any of those disturbances which come from the presence of Jackson's membrane, of Lane's kink, or "cobwebs in the attic of the abdomen."

Dr. Lewis S. McMurtry, of Louisville, Ky.—This paper which Dr. Morris has presented to us is akin to the one he read last year. I quite agree with the remarks of the last speaker (Dr. Caldwell) that the Listerian era of surgery has developed our anatomical and pathological knowledge of the abdominal cavity to an extent that was unknown before that time. It has often occurred to me that we overestimate the great change that modern conditions have made in the development of these diseases. Is it not quite as reasonable to believe that the conditions that have been described by Dr. Morris existed in the pre-antiseptic era, but were unknown to surgeons from the fact that the abdomen was not invaded in those days as it is at the present time? Just in proportion as our knowledge of gross pathology has increased the aggressive spirit of surgery has searched every corner of the organism to find something to account for other conditions of disease. These latest expressions of abdominal pathology obtain in the form of Lane's kink, Jackson's membrane, ptosis, and similar conditions. This is interesting, but what I wish to call attention to is this: Is it not probable that these conditions existed before and that, as has been suggested in the discussion, the vigorous manhood and womanhood of that day resisted these conditions and survived? What I would ask of Dr. Morris is to elaborate more fully that division of his subject which he enunciated in his epigrammatic way with the expression, "What are you going to do about it?"

Dr. James E. Moore, of Minneapolis.—Following the line of the last speaker (Dr. McMurtry) I would like to suggest that I think none of us here question the fact that our ancestors died of appendicitis just as some people die of it today. I would like to ask Dr. Morris if he thinks we are more nearly a race of degenerates today because we know we have appendicitis than our ancestors were who did not know?

Dr. Joseph Ransohoff, of Cincinnati.—I would like to ask Dr. Morris about his reference to cobwebs in the attic. I do not think he refers to cobwebs in the brain, but refers to them in speaking of abdominal disease. Am I correct in that?

Dr. Morris (closing).—I will answer Dr. Ransohoff's question first in regard to the generic term of cobwebs in the attic. When we speak of Turkey now we speak of Turkey in Asia, and now we speak of the attic in the abdomen. When I mentioned adhesions I spoke of them as occurring in the attic of the abdomen.

Dr. Horsley said we do not know what becomes of the proteids. That is true. We do not know the final disposition of them, but we do know that certain proteolytic changes take place, leaving toxic products. This proteolytic end-product, a toxin, is one which is now well understood as such by the chemists, and we know that many of the proteids, not properly oxidized, are only partly metabolized, leaving a particular poison, and this poison hypersensitizes the cell plasma of embryonic rests, I think, resulting in the formation of Jackson's membrane, Lane's kink, cobwebs in the attic of the abdomen, or other adhesions, and some of them apparently belong in the anaphylactic group of manifestations. We have an excess of development of connective tissue, I think, very much as we have in Dupuytren's contraction of the palmar fascia; but this is highly speculative. At the present time I am trying to find if we can prove that Jackson's membrane and Dupuytren's contraction of the palmar fascia are very closely related.

Dr. Byford says we are compelled to do something in order to bring about improved conditions of the race; that something seems to be wrong with nature. Of course that includes the idea that we may interpret nature's plans. It seems to me we are not ready to do that. We are given a certain number of things to play with on this earth, but we go to infinity instantly if we try to interpret nature's plans; we reach a certain point and then stop. We do know that nature made *homo sapiens gregarious;* that this gregarian habit of *homo sapiens* leaves a collection of people in cities, in urban life; and under conditions of urban life there is less oxidation of the fats and starches, and there is less oxidation going on as a result of this gregarian habit of *homo sapiens.* Why nature arranged it in this way we do not know.

Dr. Byford speaks of ulcer as due to hyperchlorhydria. Both are manifestations of the same thing. They are both manifestations of defective secretion of the chromaffin group of glands. Ulcer of the stomach in its various forms and

many eruptive skin diseases are pretty much the same thing. I believe ulcer of the stomach commonly represents about the same thing as skin diseases, the excretion of toxins at that point producing toxic injury.

Dr. Caldwell thinks that we are not agreed. Culture will go on to a certain extent. That is the history of many plants and animals. Then there will be a decline. Greece and Rome passed through their cultural periods and then declined. If you get a high degree of expression of culture the logical end of culture is elimination of the race in animals and plants. We are now going on to the logical end of culture, which is the elimination of all the present races of plants and animals.

You get the same thing in plants as in man. The Japanese cultivate various plants up to the point of doubling of the flower. Cultivation means one thing—allowing the microbes to grow. Your plant ceases to reproduce after a certain point in double flowering. When it reaches its higher development the bad microbe gets after it, sensitizes the protoplasm, and the sex cells form soma cells, the plant stops breeding, and the logical end is the end of that race of plants. Genius in man corresponds to doubling of the flower.

Dr. McMurtry asked the question if we were not overestimating the proportion of cases in which we now have toxic effects. I would answer that question of the proportion of cases in which we have Jackson's membrane, Lane's kink, and attic adhesions by referring to the statistics of decadence collected by the Equitable Life Assurance Company and to his own experience in noticing that hyperthyroidism and defects of development of the thyroid gland are very rapidly increasing in proportion. That is a very distinct tangible gland upon which we can concentrate our attention and group it with the others. What Dr. McMurtry has said is very true, and as he remarked, we may overlook a subject from deficient knowledge. I will say that Dr. McMurtry is really the author of pyosalpinx, but in his classic contribution he only brought out the fact which had been fully and well described thirty years before, and had been overlooked for thirty years. What he has said is a factor in the problem, notwithstanding we may agree, from the definite data furnished by the Equitable Assurance Company as to the rapidly decreasing birth rate in all civilized nations which have attained the highest degree of culture in proportion to the death-rate. This is all collateral

testimony, to be taken in connection with our estimate of the probable decadence of the race and diseases due to faulty development of the ductless glands.

Dr. Moore's question is answered in the same way as Dr. Ransohoff's.

Dr. McMurtry asked, What are we going to do about it? That embraces two points: (1) Metaphysics and (2) surgery. Now as regards metaphysics the idealists have one system of philosophy and the realists have established another system of philosophy. Both have finally gone on to what is known as pragmatism and from that to new realism, which admits that consciousness is a function exercised by an organism. That takes us back to science, so we can properly drop the metaphysicians in race questions. We come to the scientific standpoint and take charge of that part of the organism that falls within out particular sphere. We can cut off most of the colon: we can hang up the colon if it needs suspension. We can make a connection with the ileum and sigmoid if necessary, and throw most of the colon out of commission. We can do those things which dispose of the larger proportion of the toxins, colonic in origin, which are producing in a vicious circle decadent effects, and we thereby cut out metaphysical questions relating to the psyche.

A CASE OF COMPLETE ANTERIOR DISLOCATION OF BOTH BONES OF THE FOREARM AT THE ELBOW

By Randolph Winslow, M.D.
Baltimore, Maryland

A boy, aged nine years, was carrying a bucket filled with water along a path, when he tripped on a stick and fell on his right shoulder in soft earth, and on his right elbow on the beaten path. He was brought to University Hospital after the lapse of three days. When seen by me there was much swelling and brawniness of both arm and forearm. A small movable piece of bone or cartilage could be felt back of the elbow-joint; the epicondyle could be palpated, and a sharp edge of bone could be distinguished in front of the joint. There seemed to be some lateral displacement inwards of the forearm. The right forearm was 13½ inches in length and the left 13 inches. The forearm was semi-flexed and was somewhat movable under anesthesia. The skiagraph showed both bones of the forearm entirely in front of the humerus, and a slight sliver of bone apparently torn from the back part of the olecranon process. The lower epiphysis also looked partially separated from the humerus.

Reduction was effected, under ether anesthesia, by placing the forearm in acute flexion and pushing strongly downward. The bones returned to their natural positions and the movements of the elbow were easily executed.

The *x*-ray showed the reduction to be complete, and the separated piece of bone to be in normal contact with the olecranon.

In a not very extensive experience with dislocations at the elbow, it has been my fortune to meet with two varieties of great rarity: (1) A case of complete outward dislocation of both radius and ulna, reported in *The Annals of Surgery,* in May, 1900, of which about 25 cases have been recorded according to Stimson; and (2) the case of anterior dislocation related above.

This is also a very rare condition, and according to Stimson, "the number has not yet reached twenty-five, even including 7 cases in which the olecranon was broken off and remained in place."

Anterior dislocations usually occur in the young, and they are frequently compound. They are often associated with fracture of the olecranon process, but such cases should be excluded from this category, as the olecranon fragment remains posteriorly and only the broken anterior portion is displaced forward.

This dislocation occurs in an incomplete form when the tip of the olecranon remains in contact with the under surface of the humerus. It is said to be complete when both bones of the forearm lie entirely in front of the lower articular surface of the humerus. Of necessity there must be extensive laceration of the lateral ligaments of the joint, and probably the triceps tendon is torn away from the bone. There is also a frequent deviation laterally of the bones of the forearm. In the case herewith reported the forearm was directed to the inner side. The mechanism of the production of this dislocation is not well understood. Probably most cases are due to a blow or fall upon the acutely flexed elbow, but some are undoubtedly the result of a fall upon the palm of the hand.

In at least one case the injury was caused by traction on the extended forearm.

Fig. 1.—Complete anterior dislocation of both bones of the forearm at the elbow before reduction.

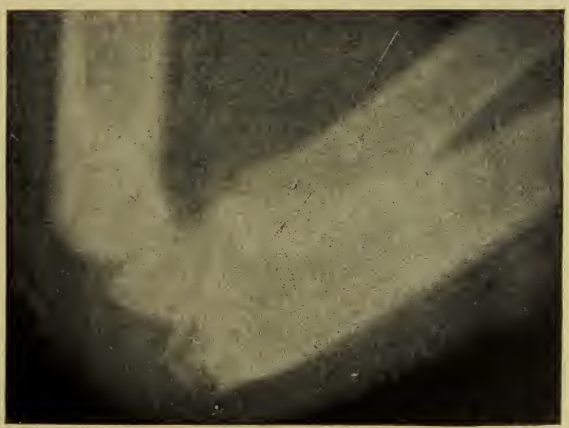


Fig. 2.—After reduction.

Of the cases reported, one came to autopsy, three were subjected to amputation, and several being compound were open to inspection. Doubtless the skiagraph will reveal a larger proportion of these dislocations than has been suspected hitherto. The symptoms ought to be quite distinctive, but as swelling occurs promptly the bony points are soon obscured and it may be very difficult to determine the nature of the injury without an *x*-ray examination. The limb is usually semiflexed and the forearm somewhat lengthened; the olecranon is seen to be absent from its usual position and the lower end of the humerus can be palpated. The olecranon process can often be felt in front of the humerus, and the head of the radius may also be palpated at times.

The course of the uncomplicated cases appears to have been fairly satisfactory but the compound dislocations generally suppurated and were either amputated or resulted in impaired function.

Reduction can usually be effected by flexing the elbow and pushing the forearm downward and backward. In some cases reduction has been accomplished by passing a band around the upper end of the forearm and pulling downward while pressure is made on the humerus to force it forward. Reduction has also been effected by bending the flexed elbow around the knee of the operator or the arm of an assistant.

DISCUSSION

Dr. Charles E. Caldwell, of Cincinnati.—I am inclined to look upon the case reported by Dr. Winslow as one of epiphyseal separation of the lower part of the humerus, with a corresponding forward dislocation. It seems to me, these cases are not very unusual in children and are apt to be overlooked, and the skiagram distinctly gives evidence of that fact. I should rather look upon that as an analogue of a fracture-dislocation, that is, a separation of the lower epiphysis of the humerus in a child, nine years of age; that is the

way the skiagram interprets itself to me, and I feel that is the condition present in that case.

Dr. Winslow (closing).—I have not the least doubt in this case that there was a genuine dislocation. It was reduced with a snap. It was quite difficult to reduce it, and there is no doubt about the olecranon being squarely in front of the lower articular surface of the humerus. There is a giving away of the lower articular surface; that is, the trochlea or the capitellum seems to be partially separated. But that it is an epiphyseal diastasis, in the usual acceptation of the term, I do not think at all. As I have said, it was undoubtedly a dislocation, which could only be reduced after trying several methods, and then was reduced with very marked difficulty.

FRACTURES INTO AND ABOUT JOINTS

By Charles E. Caldwell, M.D.
Cincinnati, Ohio

What have I to say that has not been said on the well worn topic of fractures a thousand times before? Nothing, perhaps, and yet I may be pardoned for dwelling on certain aspects of the subject which do not seem to have received sufficient attention.

First and foremost, as far as my observation in twenty-five years of medical teaching has enabled me to judge, the subject of fractures has been too perfunctorily taught, with the result that many physicians have treated their fracture cases, filled with the apprehension of unfavorable results, and a suit for damages looming up in the not far distant future.

A clearer understanding of the nature, and possible complications in any given case, would, I am sure in many instances, obviate much of the ill-feeling consequent upon the unpreparedness of the patient for the often unavoidable unsatisfactory results.

Too often in the past I am sure the medical attendant has satisfied himself by the elicitation of crepitus of the presence of fracture, and without any attempt at greater refinement of diagnosis, has reduced the deformity as best he could, applied the proper fixation, and trusted the rest to luck.

In many instances, that is perhaps as effective as any more refined method of diagnosis and treatment.

In fracture in the continuity of the long bones, the degree and character of the deformity are, to the practised eye, sufficient evidence of the nature of the fracture, and any undue difficulty in reduction can inferentially in the majority of instances be attributed to certain definite causes.

The failure to elicit crepitus is often due to the interposition of soft parts between the fragments, and however much the effort to elicit crepitus may be condemned, the fact still remains that crepitus is often reassuring as to the absence of such undesirable interposition.

Perfect apposition of the fragments without operative interference is a consummation so rarely attained, that we may feel satisfied with practically good results.

In fractures into and about joints, however, we are confronted with an entirely different set of problems, involving the integrity and consequent function of the neighboring joint. There are also to be considered those derangements of normal static conditions, which result from unavoidable angulation in fractures contiguous to joints.

It is these problems, involving the necessity of more refined diagnosis, and greater ingenuity in their solution, which I have thought of sufficient moment to form the theme of my discourse.

In so brief a space as is alloted to this subject, it will be possible to dwell on a few only of the more frequently encountered joint fractures.

I have decided to limit this paper to a consideration of fractures into, or about the shoulder-, elbow-, hip-, knee-, and ankle-joints.

The wrist has been purposely excluded, because the most common type, Colles' fracture, with its sub-varieties, has been sufficiently discussed, and offers fewer problems not already solved.

In fractures of the upper end of the humerus there are to be considered those of the surgical neck, those of the

anatomical neck, and those through the tuberosities, or of the greater tuberosity alone.

In heavily muscled, or very obese subjects with much contusion of, or extravasation into the soft parts, an accurate diagnosis can only be arrived at by the Röntgen ray. As this is not always available, a careful palpation of the parts should be practised, when not contra-indicated, under complete general anesthesia. Where general anesthesia is not advisable, the injection of a quarter to a half grain of morphine into the deltoid, together with gentle massage of the parts will often induce sufficient muscular relaxation to permit of pretty thorough palpation of the whole region of the axilla.

In making an examination for fracture, a good deal depends on the method of procedure. Inspiring the patient with the confidence that he is not to be hurt is the first, and not least important, step.

Grasping the elbow firmly with the left hand in injuries of the right shoulder, with the right hand in injuries of the left, the extended fingers of the disengaged hand are passed firmly but gently along the brachial groove, the patient's arm the while being increasingly abducted and very gently rocked, the inner surface of the humerus is readily palpated, and crepitus is transmitted to the examining fingers. Absence or presence of fracture of the surgical neck is in this way determined.

The examining hand is then shifted to the posterior border of the pectoral muscle, the fingers dug deeply into the axillary space and the head of the humerus palpated in like manner.

Fracture of the anatomical neck, according to Cotton, is extremely rare, and yet I am reasonably sure that four such fractures have come under my personal observation and care in the past five years.

Three of these cases were fracture dislocations, two of which necessitated removal of the head by operative inter-

ference, and the other was reduced to a satisfactory position by manipulation. The fourth showed distinct fracture line with slight displacement of the head, in a skiagram which unfortunately has been lost.

Personally, I have not attempted to nail the recovered head to the lower fragment, a procedure which we are given to understand has been successfully carried out by others. Aside from the question of viability, which I am as yet not altogether prepared to admit, in both of my cases the removal of the head was attended with such difficulty, owing to the manner in which the axillary vessels were displaced and stretched over the head, and owing to the density of adhesions, one of the cases having had a previous attempt made with resulting infection, that I felt quite satisfied with the removal of the head.

In both of these cases satisfactory results as regards function were obtained, and in both cases failure to remove the head would have resulted in damage to, if not aneurysm of the artery.

As to the proper procedure in fractures of the anatomical neck without displacement, the choice lies between conservative treatment with immobilization, and exposing the joint with resort to some method of fixation.

Personal predilection, and my own limited experience with this condition incline me to conservatism, but I am open to conviction, and the experience of others may lead me to change my opinion.

In fractures of the surgical neck without too much comminution, where reasonable coaptation, as shown by skiagram after adjustment and splintage, has not been attained, Lane's plates are indicated.

Where there is much comminution, with the greatest skill exercised, the plate will not hold, the result will be vicious, and the surgeon will be held responsible for what in the nature of things he could not prevent.

In such a case where operative interference is determined

upon, a resection of the comminuted segment is indicated, with transplantation of a segment of fibula to form a bridge and temporary frame for the deposition of bone.

Fracture of the greater tuberosity, unless there be much displacement, needs no other treatment than carrying the arm in a sling, with perhaps the addition of a shoulder-cap fashioned out of Bristol board.

With much displacement, it may be exposed, hooked down into place with a McBurney hook or sharp retractor, and either nailed or screwed fast.

Fractures of the rim of the glenoid rarely call for interference.

Operative interference here, as in fractures about other joints, when deemed necessary, should be prompt. Delay only complicates matters, and I am satisfied that the risk of infection is no greater than after delay, as in the case of delay there is apt to be greater operative traumatization.

If, in all operative interference the dictum so forcefully impressed upon us by Mr. Lane, to keep even the gloved finger out of the wound, is observed, it is unlikely that infection will occur.

As to the arthroplasty so successful in the hands of Dr. Murphy, I am not able to report any success thus far with this method.

It is especially desirable in fractures about the shoulder-joint to get a skiagram when possible, not only for the enlightenment of the surgeon, and as a guide to corrective measures of whatsoever nature, but as a protection to his reputation.

In hospital practice too much is trusted to inexperienced internes in the care of this class of cases, and I am sure results would be uniformly better, if earlier examinations were the rule by the visiting staff.

Fractures of the elbow may be divided into two distinct classes as regards their pathology and prognosis—fractures in children, and in adults.

Supracondylar fractures in children are usually the result of direct violence, either from a fall from a height onto the elbow, or falling with great violence onto a hard concrete pavement, as not infrequently occurs from the prevailing habit of roller-skating on the sidewalks of the city.

T-fractures in the true sense cannot occur, as the intervention of the epiphyseal cartilage precludes fracture through into the joint.

On the other hand, epiphyseal separation is of frequent occurrence, the trochlear surface, and capitellum being separated as a whole, or less frequently separately.

Such diagnoses can be made only inferentially without the aid of the *x*-ray. Separation of the internal epicondylar epiphysis is common, but of little moment.

When the incidence of epiphyseal separation is excluded, fractures about the elbow do not differ from those occurring in adults, aside from the question of prognosis as to restoration of normal function.

In children it is exceptional not to obtain good results; even cases which seem unpromising at the time of dismissal, if examined after a year or more has passed, will surprise you with a perfectly restored function.

In earlier years I met with not a few cases of gun-stock deformity, but of late, with more frequent resort to the flexed elbow method of treatment, I do not recall having had such a result.

Supracondylar fractures are usually oblique, with the obliquity from below, upward, and backward. When this obliquity is extreme, the arm would better be fixed at first at a little more than a right angle. Too much flexion will result in backward tilting of the lower fragment.

When with upward and backward displacement of the more transversely fractured lower fragment reduction cannot be secured and maintained, the patient should be profoundly narcotized, and with the palmer surface of the hand pressed deeply into the flexor surface of the elbow as

a fulcrum, the lower arm is grasped firmly with the other hand, and at the same time firm pressure being made by the hand of an assistant downward and forward on the lower fragment, the arm is flexed to an acute angle, and fixed with a plaster over a heavy layer of cotton.

At the end of ten days, the spica is removed, massage of the elbow with slight passive motion is practised, and every day thereafter, increase massage and passive motion, until at the end of four weeks the patient is encouraged to practise voluntary movements of the elbow, lift pails of water, and in other ways complete the restoration of function.

In cases of obliquity with much tilting of the lower fragment, a resort to bone-plating is advisable.

In fractures of the olecranon with much separation of the fragments wiring is indicated. Superficial bone plates are not advisable.

On the other hand, fractures of the radius above the pronator should be plated.

In cases of hopeless comminution of the elbow with wide separation of the fragments, time will be saved and better results obtained by immediate resort to excision or removal of all interfering fragments, and arthroplasty, according to Murphy attempted. In compound cases infection is apt to interfere with favorable results in the attempted arthroplasty.

When and when not to operate in these elbow cases, requires a great nicety of discrimination. Many cases which from the *x*-ray picture would seem to offer little hope of functional restoration, do in time disappoint us happily, whereas some apparently slight displacement of a fragment such as the *capitellum humeri*, may cause locking of the joint.

Forcible attempts to loosen up such a joint only make matters worse, and removal of the offending fragment under strictest aseptic technique, offers the only solution.

It will not be long before the layman appreciates the fact

that the proper place to treat fractures is the hospital, where every facility, both for diagnosis and treatment, is available.

In fractures about the hip-joint, fractures of the femoral head and neck only will be considered.

When a fracture is medianward of the trochanter it has been customary to speak of such a fracture as intracapsular, when, as a matter of fact, a fracture at the base of the neck may not, strictly speaking, be within the capsule.

Differentiations of so refined a nature can obviously be made only by the aid of a skiagram.

Whether fractures of the neck within the capsule, other than impacted ones, are ever followed by bony union is problematical.

It is not always possible to determine absolutely whether the fracture is or is not impacted, but impaction may be inferred from certain physical signs.

Cotton, in his classical work on *Dislocations and Joint Fractures*,[1] has so accurately tabulated the differential signs

[1] Signs of impacted fractures of the neck:

(*a*) Disability.

1. Uniformly there is inability to raise the leg from the bed. (He has seen one exception to the rule. I have also seen one.)

2. Usually walking is impossible.

(*b*) Flexion, extension, and rotation are limited and usually painful.

(*c*) In cases showing eversion, further eversion is possible, but no inversion can be carried through without undue force.

(*d*) In the rare cases with inversion, eversion is impracticable.

(*e*) There is shortening, but a shortening running from only ¼ to 1 inch.

(*f*) There is abnormal prominence of the trochanter, as a rule, due largely to:

(*g*) Loss of normal tension of the *fascia lata*.

(*h*) There is usually a distinct loss of the hollow corresponding to the digital fossa behind the trochanter.

(*i*) There is almost always a perceptible thickening over the front of the joint.

(*j*) There is not apt to be much local pain, tenderness, swelling, or other of the usual fracture signs.

(*k*) Crepitus of course is absent unless impaction is broken up.

between impacted and unimpacted fractures, that I cannot refrain from quoting him.

The breaking up of a comminuted fracture of the neck of the femur is always an undesirable thing, and an *x*-ray picture, when obtainable, is the best precautionary measure.

In unimpacted fractures what chance have we of a useful limb, without operative interference? Very slight, it must be admitted, but shall we on this account unhesitatingly advise operation? I for one am not prepared to say yes, although the temptation to give the patient a chance for a strong and useful limb is a great one. Under aseptic technique, I am not willing to admit that the risk is great, and yet how few surgeons who blithely recommend operations to their patients, would elect them were the choice given them? This in itself is an admission of a risk greater than we ourselves would care to take.

If, however, the patient is young or middle aged, leading an active life, I should not hesitate to place the operation in as favorable a light as the facts in the case warrant.

In a patient past the prime of life, of sedentary habits or occupation, I should advise him strongly to abide by the results of conservative treatment.

Signs in unimpacted fractures:

(*a*) Shortening.

1. Usually greater than in impacted cases.

2. Tending to increase under the undisturbed pull of the irritated muscles.

3. Varying with even gentle manipulation, *i. e.*, with intermittent traction.

(*b*) Disability—more extreme than in impacted cases.

(*c*) Eversion—more extreme, without any powers to invert actively.

(*d*) Lack of any check to passive inversion or eversion.

(*e*) Rotation of the (palpable) trochanter takes place on a shorter rotation axis than in the normal leg, or in an impacted fracture.

(He admits that although this last sign is classic, it is not always demonstrable.)

(*f*) Crepitus is not always obtainable, often not obtainable except by carrying out rotation, while strong traction is exerted on the leg to bring the fragments opposite one another, a procedure obviously unjustifiable except to confirm a diagnosis already made of loose fracture.

In very old people I save their lives by letting the fracture take care of itself.

In fracture dislocations where the age and condition of the patient permit, operation is imperative.

In ordinary fractures of the neck, apposition of the fragments may be secured by exposure of the capsule without opening it, and secured by a drill driven in through a separate incision over the trochanter. This drill may, if considered advisable, be left in place for as long a time as seems expedient, and then removed at will.

In separation of the epiphysis, opening of the capsule will probably be necessary to secure apposition of the fragments.

If the capsule be already torn, or there be much fluid within the joint, it may be well to open the capsule in any event.

How effective conservative treatment in abducted position of the limb by maintaining apposition of the fragments may be, I am not prepared to say. I have in one case, however, obtained most excellent results by this method.

Fractures through the trochanters in my experience are not infrequent, and are usually found in linemen, painters, and others who are liable to falls from great heights. They are caused by direct violence, and may show considerable comminution. The degree and character of the displacement will determine whether nailing will be nceessary or not. Much comminution is apt to interfere with the success of nailing.

In the consideration of fractures about the knee-joint, patellar fractures may be dismissed in a word; the choice being with the surgeon whether he will wire or use Stimson's method. In passing, however, I may dwell for a moment on the advisability of securing an *x*-ray picture as illustrated by the experience of one of my colleagues. The patella had been examined for fracture, and none discovered. An *x*-ray picture was taken, and much to his surprise revealed a

fracture with at least half an inch separation of the fragments. Questioning the patient developed a history of previous fracture. The ligamentous union was sufficiently firm to render the fracture inappreciable on careful examination. Such a fracture overlooked, might have been the basis of subsequent legal complications.

Other fractures about the knee comprise supracondylar fractures of the femur, fractures of one or both femoral condyles, T-fractures, separation of the lower femoral epiphysis, separation of the tibial epiphysis, fracture of one or both tibial condyles, T, or comminuted fractures of the spongy portion, separation of the tibial spine or tibial tuberosity.

Fractures above the condyles, or separation of the femoral epiphysis where the lower fragment is tilted or displaced backward, are best treated after reduction on a double inclined plane, the angle being adjusted to the individual case. This treatment is more effective in keeping the fragments apposed than any system of extension. In children upright or perpendicular extension will be advisable if care be taken that the extension is constantly maintained. To avoid rotation it is advisable to encase the limb in a plaster spica after application of the extension straps.

With the inclined-plane treatment as much extension may be used as may seem expedient in any given case.

X-ray examination will often determine the angle at which to maintain the double incline, or the amount of extension necessary.

Angulation of the fragments after repair may cause great disability either by causing faulty static conditions or by pressure on the popliteal vessels or sciatic nerve. I have in mind a patient who was a sufferer for twenty years from the last named complication.

Equally disastrous in their effects upon the function of the joint may be certain fractures of the head of the tibia, which alter the plane of the weight-bearing surfaces and at

the same time cause more or less stripping of the menisci. In the same catagory may be placed fractures of the tibial spine. These obscurer lesions are rarely rightly interpreted without the aid of the Röntgen ray.

The knee-joint plays so important a part in weight-bearing, that every possible means should be used to prevent union with displacement.

By early and accurate appreciation of the conditions present, much may be accomplished by ingenuity and patience.

No routine method of treatment should be adhered to, but each case should be studied and treated as a unique case. In this way, and in this way only, may one hope for the best results.

Manipulation under anesthesia will effect much in the way of replacing fragments, and once replaced, it often is the matter of a skilfully applied plaster spica over properly adjusted gauze compresses, to maintain the replacement.

Here is where accurate anatomical knowledge and an early training in osteology is of service.

The bones going to form the knee-joint are so accessible to operation that there is often the temptation to correct by operation that which may be accomplished by manipulation.

Theoretically, open operations on fractures aseptically conducted, should be of benefit in every way: (1) by giving us a complete insight into the nature and extent of the injury; (2) by enabling us to bring about more perfect adjustment, and (3) by relieving much of the edema and blood stasis which is often so troublesome.

Practically, we must bear in mind that infection does and will probably continue to occur in a certain, though perhaps small, percentage of cases, and where infection does occur, the last state of that man is apt to be worse than the first.

In fractures about the ankle, we have Pott's fracture,

fractures of the external and internal malleolus, fractures of both malleoli, separation of the lower tibial epiphysis, fractures above the epiphysis involving both bones, splits of the tibia from impact of the astragalus, and, conversely, fractures of the astragalus from impact of the tibia.

In spite of the superficial position of the bones at the ankle, in fracture the swelling is often so great, the region so tender, that aside from the evidence of deformity, it is often difficult to arrive at a true estimate of all the damage done. This is readily seen in many of the illustrations which I present.

Where there is much outward displacement of the lower fragment of the tibia as shown in Fig. 15, after traction has been effective in bringing the fragment down into position, the foot should be fixed in a position of varus. Bone-plating about the ankle is often exceedingly difficult and equally unsatisfactory in the very nature of the conditions which make resort to it necessary, *i. e.*, irreducible displacement of fragments which sometimes resist every effort at reduction even with the open method.

I have perhaps tried to cover too much ground in this paper, which must excuse many of its short-comings, but it at least opens a wide field for discussion.

DISCUSSION

Dr. Randolph Winslow, of Baltimore.—The paper of Dr. Caldwell is so comprehensive, covering practically the whole field of fractures of the long bones, that it is impossible to speak of more than a few points, on account of the fact that there are several subjects discussed in the paper. One of these is fractures of the surgical neck of the humerus.

I have had a number of such cases, and have found it impossible in some instances to reduce them until the arm was drawn into the position of abduction, and in that position the bone held together by means of screws, and I have had some good results from that work. There is at this time in the hospital

with which I am connected a case of fracture and dislocation of the upper end of the humerus, in the hands of a young man who was formerly my assistant, who, after exposing the shoulder, was unable to reduce the displaced upper fragment without completely detaching it; that is, he detached it as a fragment, and then nailed it to the top of the shaft, and up to this time everything apparently is going on with satisfaction. Of course, you cannot tell what is going to happen. I have never in dislocations with fracture at the shoulder, nor in fracture without dislocation, had to either resect the head of the bone or to separate if from its surroundings. I have been able to bring them together always. A great deal can be done in a fracture of the neck of the humerus high up by first reducing the fracture and putting it up in the abducted position. Recently Albee has recommended that position, and it is known as his method.

In regard to the fractures of the neck of the femur, and particularly fractures known as intracapsular fractures of the neck of the femur, they usually occur in old persons, but not always. If they occur in old persons, and particularly in those whose general vitality is depressed, then as Dr. Caldwell has said, what we try to do is to save the patient's life, and let the leg take care of itself.

I have had several cases, rather recently, of fracture of the neck of the femur, and indeed, intracapsular fracture of the neck of the femur, in old persons who were not old. One of these was a woman, aged fifty-four years, who had an absolute intracapsular fracture of the neck of the femur. Both the *x*-ray and operation showed it. I exposed the bones, passed a screw and nail from the trochanter into the head of the bone and bony union resulted. I have a man at this time with practically the same injury, although he did not come until nine weeks after the injury. In his case there are two nails running from the trochanter into the head of the bone. In seven or eight weeks union has occurred. I tried it a number of years ago on a boy, so that I think in young persons and middle-aged persons of vigor, we get better results after operative procedure than by any attempt to treat them by splints and other external appliances. When they get too old, it is no longer a matter of what is best for the leg, but what is best for the patient. Personally, I do not know of bony union of intracapsular fracture of the neck of the femur in elderly

persons or in any other people, when treated in the usual manner.

Many of these other fractures are extremely interesting, particularly fractures about the knee, supracondyloid fractures, and in the vast majority of cases the best way to do is to expose them and fasten them together by nails, screws, or wire, so that the bones can be held together. The tendency of the gastrocnemius is to pull the condyles backward, and it is often impossible to maintain apposition unless the bones are fastened together by screws or nails. I think the pendulum has swung too far. We having been following Mr. Lane rather too much. Mr. Lane's position is too far toward the operative treatment. Probably some of the members in this room have broken their limbs at various times and have gotten good results. Certainly, in a large proportion at least of cases of fracture, perfectly good results are gotten without operative procedure. If one man can develop sufficient skill so that all of his cases run a favorable course in his own hands, it is more than somebody else can do. At any rate, I think we have gone too far in the direction of Mr. Lane, and that certain fractures can be treated satisfactorily without operation, while others cannot be treated satisfactorily except by operation.

Dr. A. A. Law, of Minneapolis.—I am particularly interested in intracapsular fractures in old people, and I cannot agree with what the previous speaker (Dr. Winslow) has said, namely, that "we should let the leg go to pot and try to save the life of the patient." In the University of Minnesota we have followed an entirely different procedure, and our results have been distinctly different from those spoken of by Dr. Winslow. We resort to the treatment suggested by Maxwell and Ruth in old people, rather than let them be up and about, with the prospect of a deformed joint and a lack of function of the joint. We put these fractures up after the Maxwell and Ruth method, with which you are familiar, and it is unnecessary for me to go into details. One of the patients treated by this method was aged eighty-seven years, another ninety-two years, both have functionating joints and union. We have had 10 cases of fracture of the neck of the femur, and in the University Hospital and in private work we have treated these old people by the Maxwell and Ruth method with almost uniformly good results. One woman was aged seventy-eight years; she developed senile dementia, and we could not do anything with

her. She has not obtained union, but that was due to the fact that she got out of bed after the dressing was put on, but in every other instance we have a functionating limb and union. Dr. Moore had one patient who was aged ninety-two years, and she got an absolutely functionating joint. Therefore, I do not think we are warranted in leaving these cases alone, provided with proper treatment by the above-mentioned method, we can let these patients sit up in bed at the end of two weeks with the extension still on and get just as good results from so doing.

Dr. Winslow advocates the "let-alone" policy because of the danger of pneumonia; we believe this danger is remote, in no instance has one of our old patients had pneumonia while being treated.

Dr. Robert T. Morris, of New York City.—I have published a preliminary note in regard to the treatment of these cases in the *Journal of the American Medical Association.* In those cases in which we do not wish to do an open operation, we may in selected cases do a simple operation. (1) Put the limb behind the fluoroscope; (2) run a narrow-bladed knife down near the fracture; (3) put in a cannula; (4) run a drill through the cannula, transfixing both fragments; (5) run in a silver pin and leave it there, taking out everything else. You can pin a whole lot of fractures behind the fluoroscope under the influence of cocaine, and even spike the hip with a pin, and not keep the patient in bed at all after the operation. That does away with the disadvantage of keeping them in bed. In many fractures in joints you can put in a simple pin and do a simple operation.

Dr. Alexius McGlannan, of Baltimore.—I protest against the criticism of the teaching of the treatment of fractures so far as the College of Physicians and Surgeons of Baltimore is concerned. I quiz the fourth year graduating class one-third of the year systematically on fractures, and in addition they are given advice and instruction on such fractures as come into the clinic. Students do not suffer from a lack of instruction in the treatment of fractures in this school.

With reference to the fractures of the hip and fractures of the shoulder, they are best treated in abduction after the method of Bardenhauer, and this method of holding a fracture of the neck of the femur is much like the Ruth treatment with traction in two directions. There is a disadvantage in

traction by adhesive strips, in that it is difficult to maintain the traction in any special line.

As far as our experience with fracture of the hip is concerned, the results have been much better where we have deliberately abducted, rotated in, and extended the fracture and put the limb in plaster-of-Paris, as recommended by Whitman. He also recommends plaster-of-Paris in abduction for fracture high on the humerus. We have added to Whitman's position flexion of the thigh on the abdomen and the leg on the thigh, so that the patient is in a double inclined plane position, can be set up in bed by pillows behind his back and lie flat in bed by pillows under the flexed leg at night.

As to the question of breaking up impaction in a young individual, we should always break up impaction, as Whitman has pointed out. If we leave an impacted hip, we leave an adduction deformity, and this is a serious disadvantage, so that we will have to do a subtrochanteric osteotomy for its relief. In a recent fracture the impaction can be broken up by opening with the hinge motion and getting union without disagreeable deformity. The age of the patient is not so important as the general condition. We have found that alcoholics, after a fracture of the femur are disagreeable patients to care for, and die suddenly of pneumonia or of kidney insufficiency. Therefore before plating or making any sort of fixation of a fracture, it is well to test the patient's ability to remain quiet in bed. If the patient during the first three or four days is restless, if the patient has diminished urine, and what so frequently happens in women, if the patient has incontinence of urine and incontinence of feces, it is best not to attempt fixation. If none of these things are apparent, we can fix the fracture and get good results.

Dr. Caldwell (closing).—I shall try to limit my closing remarks very largely to the statement made by Dr. Law with regard to the treatment of fractures in old people. Most of my cases in old people, aside from a few in the hospital, have been private cases, and they have ranged in age from seventy-five to ninety-three, which was the age of the last one, and I felt conservative treatment was the best thing to adopt there, because if you keep such a patient on the back for a week or ten days, it is a serious matter. It may mean hypostatic pneumonia, and I would rather that such a patient get up with a badly functionating limb than to die of pneumonia in the first week.

As regards the method outlined by Dr. Morris, while it may be a very useful one, unfortunately everyone of us cannot avail himself of the skiagram in the operating room, and not all of us could exercise the skill of Dr. Morris in adjusting the drill to the parts. Personally, if I were going to drill I should prefer the open method, exposing the capsule and fixing it through the capsule and driving the drill through a separate incision in the trochanter.

With regard to my criticism of the teaching of the subject of fractures, I will say that it applied more to the teaching in the past in general, and of course was not intended to be taken as a reflection on the methods prevailing in any school nor, especially, that in Johns Hopkins.

SIGMOID ADHESION

By Hubert A. Royster, M.D.
Raleigh, North Carolina

A very interesting and important problem is the elucidation of left-sided pain in women. So much is being said and done about pain in the right abdomen of both males and females that our attention for the time is directed away from other regions. Kinks and membranes are the order of the day. Thus far those which are named are found upon the right, but not to be ignored are similar conditions occurring at the other end of the large intestine. Adhesion of the sigmoid is associated with definite symptoms, which, I believe, may be relieved by simple means.

Three years ago in a paper[1] read before this association I ventured to point out the existence of adhesion of the sigmoid to tube and broad ligament as giving rise to much of the suffering in cases of salpingitis. Further observation and experience have served only to strengthen the opinion then expressed. Indeed, the whole question has assumed a broader aspect and it enters into the consideration of every pelvic case in our work, whenever left-sided pain is a prominent symptom. This is a common complaint of women, but it is not always properly interpreted. Too often the ovary is regarded as the chief offender and needlessly sacrificed. It is not too much to say that the ovaries themselves are rarely the actual seat of pain. More often tubal disease is the source of pelvic suffering and usually

[1] Southern Medical Journal, vol. iii, No. 1, and Trans. South. Surg. and Gyn. Assoc., 1909.

precedes ovarian involvement. In numbers of instances neither tube nor ovary are affected and some other explanation of the pain is demanded.

The particular thing which is characteristic of the sigmoid adhesion is pain during defecation, not so much before or after, but during the act. Patients will sometimes describe a temporary stoppage at a certain point. Constipation is the rule; but, a small proportion of the cases have shown loose bowels with mucous discharges alternating with the constipation. This condition is seen largely in old women past the climacteric, in some of whom the uterus is plastered back against the rectum. There is also a dragging sensation which comes and goes and even a constant aching. Usually the pain is low down, below the anterior superior spine of the ilium; at times it may be high, as far up as the splenic flexure.

Physical examination brings out very little evidence. Tenderness is never marked and does not exist at all in the majority of patients. The diagnosis must rest upon the subjective symptoms, and the presence of the adhesion is to be suspected in any case of left-sided pain. Excluding pelvic disease is a great help, though not essential; for the sigmoid adhesion may occur on account of lesions in the pelvis or independently of them. In either event the indications are the same. If, however, affections of the ovary and of the tube can be eliminated, the bowel adhesion may be more positively predicted.

With the ordinary conditions in which the sigmoid is involved in widespread pelvic inflammation, just a dense conglomerate mass, we have here no concern; for such adhesion is but an incident and is overshadowed by the pelvic disease. The form of adhesion generally seen as the cause of the symptoms just detailed is that in which the sigmoid is carried far down on the broad ligament, placed against the lateral wall of the pelvis or even pushed up over the Fallopian tube. Of course, the position of the

Fig. 1.—The sigmoid adhesion as typically seen involving the Fallopian tube.

FIG. 2.—The sigmoid is raised on the forceps, showing depth and extent of adhesion.

Fig. 3.—The adhesion has been divided crosswise between forceps and is being sewed up longitudinally with interrupted catgut sutures. This allows the sigmoid to drop away from the tube and underneath the broad ligament.

sigmoid flexure may normally show wide variations. It may be attached at different levels; it may be tense or slack. For the purpose of our present consideration it becomes pathological only when it is adherent in an abnormal position, fixed and permanent, and gives rise to symptoms.

In respect to the origin of the sigmoid adhesion we are very much at sea. Undoubtedly in some instances it has resulted from previous mild cases of pelvic infection in which the ovary may or may not have escaped. As a rule, we have observed that the more severe the symptoms, the more was the tube involved. But there are not a few which show no sign of adnexal disease, and these must have something to do with the factors that are supposed to work in other parts of the abdomen, viz., intestinal stasis and faulty posture. It seems evident that putrefaction inside the intestinal tube has much to do with all these specific adhesions, either as cause or effect, or both. The vicious circle idea could not be better illustrated.

There is a clear-cut symptomatology associated with adhesion of the sigmoid. In addition to the nine cases referred to in my former paper, there have appeared fifteen more in which the sigmoid adhesion has been the sole lesion found to explain the symptoms. For the most part the diagnosis was made, tentatively or positively, before operation and found correct; in some instances the condition was not found when it was suspected; while in others it was discovered when not suspected. At any rate, one should be able to pick out the condition in the majority of cases. Typical examples are these: A young married woman, who had given birth to three children, complained incessantly of pain in her left side and was sent in as a case of tubal disease. Her greatest suffering was on going to stool and she was obstinately constipated. Pelvic examination was negative. Her abdomen was opened and a classic sigmoid adhesion revealed. This was dealt with and the abdomen closed. After the operation, even while lying

in bed, she never required a purgative and has been entirely free from pain, now more than two years. This is an operation which can be safely and successfully done for constipation. Another instance was that of Mrs. W., aged thirty-two years, who, several years before, had had a still-born child and who had been twice operated on without relief for supposed pelvic infection. Left-sided pain and real obstipation were the features of her story, while scanty, painful menstruation added to her discomfort. She presented the appearance and signs of chronic intestinal stasis. Three years ago an old dense adhesion of the sigmoid flexure to the tube was released with difficulty and after a rather prolonged convalesence the patient was restored to health both in feeling and in looks. At the present time she has no pain and is but rarely constipated. On the eighth day after operation the cul-de-sac had to be punctured to let out a collection of blood which had oozed slowly down from the insecurely approximated raw surface. This is likely to happen particularly in cases of long standing, unless great care be exercised.

The method of dealing with the adhesion may be quoted from my former paper: "After snipping the bands which fix the sigmoid to the broad ligament, there are left two triangular raw surfaces, one on the bowel and the other on the ligament, with their bases together; these form a diamond-shaped area. The peritoneal edges are then closed over this space by continuous catgut, applied from below upward. This sigmoid is thus allowed to drop lower down into the pelvis away from the tube and ligament — a maneuver which, in my opinion, must be executed to secure permanent relief. Covering all denuded places is not less important." The only modification of this technique which we now advise is the use of an interrupted catgut suture instead of a continuous one, adding an additional warning in regard to careful hemostasis.

Incision at the outer border of the left rectus gives easier

access to the parts. It will be more often necessary, however, to operate through the median line on account of the occasional association of other lesions in the pelvis. In either event the incision should be long, longer than is usual for ordinary abdominal work, in order that the manipulations may be readily carried on.

The real problem before us is to determine what makes the adhesion at this particular spot. It must be borne in mind that the large bowel is apt to kink at certain places where the turns are sharp and this is more liable to occur at the fixed points. The ceco-iliac region has received its share of attention and the hepatic bend has given us the famous expression of "cobwebs in the attic." The splenic flexure is of more importance than has appeared from the little consideration given it. I think I have shown that the sigmoid adhesion is a distinct surgical entity and that it is amenable to proper treatment. Now, the same agencies must be at work in all these conditions. Is the large bowel only at fault? All the physiologists and internists have told us that the condition known as "intestinal indigestion" is due to fermentation and insufficient digestive action in the small bowel. What has the large intestine to do with it? Shall we go behind the returns and look for trouble higher up? It is actually intimated that even Mr. Lane is weakening and has begun to inquire whether after all the whole affair does not originate in decomposition of material in the small intestine.

At any rate, we can say for the sigmoid adhesion that it may occur, first, as the other intestinal kinks do, from a combination of congenital predisposition, improper support and intestinal putrefaction; or second, it may result from inflammatory conditions in the pelvis. In many cases both sets of causes obtain. And no matter whence it comes, it is to be reckoned with. No affection of its kind within the abdomen shows more definite signs or gives fairer promise of cure.

DISCUSSION

Dr. Guy LeRoy Hunner, of Baltimore.—I think Dr. Royster's paper is a very important one. It deals with an important subject, although with one of the minor ailments, of abdominal cavity. It is a condition easily relieved, but a condition which is also easily overlooked. The first two or three cases I saw of this condition had each been operated one or more times for pelvic and abdominal conditions which had been credited with causing the real trouble, and finally these adhesions were found and relieved with recovery of the patients. This is where its importance comes in: it is so likely to be overlooked unless one has the condition in mind while making a diagnosis and during the operation.

As regards the etiology of the condition, I will say that the large bowel has been "kicked around" a good deal in this meeting, and I am glad to suggest that possibly some of these adhesions do not come from the large bowel itself, but from without to the sigmoid. I find in some of these cases the adhesions run from the internal inguinal opening and spread over to the large bowel in the shape of a fan. The infection has apparently not come from the large bowel at all, but from the lymphatics running into the peritoneal cavity with the round ligament. I find some of my cases of chronic urethritis are associated with this condition of left-sided pain, but of course not all cases of chronic urethritis in women who have pelvic pain on the left side have these adhesions. It is astonishing how women with chronic urethritis can have pain reflected to any part of the pelvis. But in some of these cases you will find in operating there are sigmoid adhesions. An interesting feature in helping to make a diagnosis in the urethral cases is the fact that when the urethritis is bad, giving the severe bladder symptoms the left-sided pain is also bad, apparently due to the toxic products being carried by the lymphatics from the urethra up into the inguinal region and making the band of adhesions sore. Furthermore, I find some of these sigmoid adhesion patients occasionally give a history of recurring rectal fissure. The left-sided pain is aggravated when the fissure is open and the lymphatics are taking up the infection or toxins from that region.

Dr. Henry T. Byford, of Chicago.—I would like to say a word or two with reference to the diagnosis. The interesting

cases are those in which there is not much in the way of physical signs. In women who complain of left-sided iliac pains extending upward, the probabilities are that the left appendages are affected and if the adhesions affect the sigmoid they extend to it from the appendages. In such cases the pelvic examination is usually quite positive. In cases of adherent appendages in which the adhesions are not connected with the sigmoid, the pain is usually situated lower down. In making a physical examination the rectum seems more normal in those cases in which the adhesions are due to rectal trouble. The lower rectum feels soft and collapsed. In those cases due to adhesions from the appendages and uterus, the absorption of exudate about an old pyosalpinx often draws the anterior rectal wall away from the posterior wall and the lower rectum is ballooned and full of air instead of collapsed and empty. In those cases due to sigmoid inflammation there are not many physical signs. There is usually a history of constipation or diarrhea or both. If there is constipation the woman may have been taking laxatives for two or three days and have habitually forestalled the diarrhea. These patients have occasionally rectal or sciatic pain on defecation and mucous stools, etc., without very often feeling much pain down about the lower rectum.

There is a certain class of symptoms in these cases which I have not heard mentioned. There is sometimes pain in the sacro-iliac junction, so that one sometimes wonders whether the pain is in the joint or comes from the rectum. It is apt to be connected with gouty symptoms and sometimes with tenderness in the sacro-iliac joint. Some have pains in the gluteal region. Others have cramps in the limbs. By looking carefully for these so-called gouty symptoms and reflex pains, with a history of intestinal disorders and noting the absence of physical signs in the true pelvis, we can trace the origin of the adhesions to the rectum.

Dr. James E. Moore, of Minneapolis.—Since Dr. Royster called attention to this subject three years ago I have been very much interested in it. My experience since that time has enabled me to confirm his statement that sigmoid adhesions are a definite surgical entity, and that we can relieve them by surgical measures. I have found two classes of cases, those that begin in the tube and extend to the sigmoid, in which the adhesions were firm; the other in which trouble began in the

sigmoid itself and adhesions were formed on that account. There is in a certain number of cases a definite symptom that will enable you to make a positive diagnosis from the ordinary examination, and that is a sausage-shaped tumor extending up the left iliac region toward the splenic flexure. It can be felt distinctly. Your first impression is that you feel over the abdomen a large tumor, but when you make an examination below you will find that it is not directly due to the tube; you can map out the tube, and by carefully palpating the sausage-shaped tumor find it is not so dense, or not so tense as a distended tube.

It has more the feeling of a ball. By making a proctoscopic examination your diagnosis is clear. When the case is one of old tubal trouble, you can make out inflammation of the tube by vaginal examination. When it is due to beginning trouble in the sigmoid, you can make a diagnosis with the sigmoidoscope. You find not only the sigmoid is drawn out of place, but if you turn to a point beyond the median line to get above the flexure, you will find a local inflammation of the lining of the sigmoid. You can map it out distinctly. In the cases I have observed in which I have operated and relieved these adhesions with credit to myself, the adhesions were not a marked feature on the other side of the abdomen. I am inclined to believe a great deal in the point Dr. Gerster made last year at Denver in his paper before the American Surgical Association, that toxemia has a lot to do with the formation of intestinal adhesions and Jackson's veil, and the like. It seems to me, in the few cases I have seen of this kind, that here we have a local inflammation of the sigmoid. We have a toxemia there and probably the colon bacilli wander out in a few numbers just sufficient to set up a plastic inflammation and not enough to start up a suppuration. Therefore, with your examination in the ordinary way, getting a sausage-shaped tumor extending up toward the left, excluding the tube, you have a definite entity, and with the use of the sigmoidoscope you can complete the diagnosis. I have some grateful patients upon whom I have performed this operation.

I prefer to make the incision in the median line, because the other incision is necessarily a bloody one on account of the veins accompanying the deep epigastrium.

Dr. Walter B. Dorsett, of St. Louis.—In the discussion this morning the feminine pronoun has been used to a greater

extent than the masculine, and if these adhesions occur in women more particularly, it seems to me we have to admit that we are faulty in our diagnosis, or we have operated and done poor surgery. If these conditions exist more particularly in females than in males, it is certainly an excuse for such a supposition. If this condition is due to the colon bacillus or to toxemia, it occurs to me that it is just as frequent in the male as in the female.

I agree with Dr. Moore as to the technique of the operation, that is, to make an incision in the median line because of the fact that I have had some unpleasant complications in making an incision to the left of the rectus muscle.

Dr. Gordon K. Dickinson, of Jersey City (by invitation).—All types of immobilization or pexies of the viscera give pain and distress. With reference to immobilization of the sigmoid, I have divided the cases for several years into four types. One is the congenital, where the attachment of the left adnexa to the sigmoid is rather closer than usual and interferes with its function. The second is inflammatory from the left adnexa. The third is one in which there is inflammation around the ceco-appendix, which draws it over to the right and immobilizes it, and the fourth is the type Dr. Royster spoke of as adhesion of the sigmoid, and this we may call the Royster sigmoid. To me he has given us a very perfect description of diverticulitis or multiple small diverticula of the sigmoid. These I see every now and then, and in describing the symptomatology I thought he would speak of one of the causes of adhesions in the neighborhood of the cecum. These diverticula are small, laid over by the fatty tabs and adhesions, and without further research we may discover them to be multiple diverticula.

Dr. J. Wesley Bovée, of Washington, D. C.—I would like to say a few words on this subject. I am glad Dr. Royster has so clearly defined this type of condition because I think it limits it very markedly. He says it is a class of cases which has definite symptoms of its own, and therefore it is one that calls for relief, and that relief comes from surgical procedures. To my mind this affection comes largely from disease of the appendages. When we have infection of the left appendage it is not entirely on the peritoneal surface; it also spreads under the peritoneum, and we have the infiltration of connective tissue under the peritoneum which gives rise to adhesion. One class of cases that gives rise very largely to this is that

class in which, upon examination, I will admit I am not always sufficiently expert to find the Fallopian tube and the ovary. It is not an easy matter to mark out and differentiate between tubal and ovarian disease and this condition. Speaking for myself, I am not expert enough in many cases to even find the tube and ovary when they have become diseased as the result of old infections and are plastered on the wall of the pelvis. If it contained pus and the pus was absorbed, we have a small tube and ovary both buried in adhesions, and on the surface one cannot find it nearly as easily as he can find the round ligaments or the ureter in normal cases by bimanual examination. So I wish to call attention to that feature.

In the large majority of cases of left-sided pain in which we do not have adhesions, I have mentioned very old disease of the appendages having caused them to become small through the efforts of nature. Ofttimes adhesions cause fecal stasis and such left-sided pain. If we can keep the bowels freely open by proper purgatives and irrigations of the sigmoid, we find, to our comfort, they are relieved of the pain in such cases. But, of course, Dr. Royster has not included that class in this variety. I am sorry we have not heard a word or two from some of the gentlemen present, probably a number of them, who are accustomed to sew the sigmoid over the top of the pelvis and separating the pelvic excavation from the abdominal parts of the peritoneal cavity in cases of pelvic infection. They usually suture the sigmoid to the posterior surface of the fundus of the uterus to prevent adhesions between the loops of intestine which might get down on to raw surfaces from which the tubes and ovaries have been separated. I would like to hear something from them in regard to adhesions resulting from such a procedure.

Dr. Thomas S. Cullen, of Baltimore.—I would like to ask Dr. Royster in what percentage of cases these adhesions occur in men?

Dr. Royster (closing).—I am very glad Dr. Hunner mentioned the reflex pain from urethritis in the female, because that will help us to clear up some of the cases. We have also observed the same pain as a reflex in cervicitis and cervical lacerations in women, giving pain on the left side, which simulates this condition.

I mentioned the occurrence of sigmoid adhesions as the result of pelvic disease. I will say that I have pointed out

very emphatically that a large part of these adhesions is due to the presence of former disease in the pelvis, particularly salpingitis. But that does not weigh in the question of treatment, because we must give relief, no matter to what the condition is due. I also think I said that the incision in most cases should be made in the median line, but we have operated through the left rectus in a few cases and have been frequently very glad we did so.

In regard to Dr. Dorsett's question concerning the frequency of this condition in women. I will point out the fact that gall-stones, chronic intestinal stasis, constipation, and all that sort of thing are more common in women than in men, and Dr. Cullen's question may be answered by asking another, namely, How many cases of left-sided pain has he ever seen in men? If you think about it, it is very seldom we find a man who complains of left-sided pain. I have operated on one such case and did not find anything. I think we must understand that the frequency of this condition in women is due to two causes: (1) From pelvic conditions; (2) the fact that all of these troubles we have been discussing are very much more common in women than in men, a point which I think is perfectly obvious from their mode of life. Woman as a constipated biped is still with us, particularly as this constipation represents a vicious circle.

I appreciate Dr. Dickinson's nomenclature, but I would like to say that in these cases, as I take it, there is no question with regard to diverticula, because diverticula presuppose a recess, small or large, in the wall of the gut sooner to later. They may form by virtue of the sigmoid adhesions, but the cases I have seen were not associated with diverticulitis.

In conclusion, there are undoubtedly cases in which the adhesions recur, and the great problem in regard to the operative technique is prevention of the recurrence. I have had some of them come back after two years complaining of the same symptoms. In only one or two instances have we found the recurrence absolute, but in some cases we find other adhesions occurring, as will happen in many abdominal cases. I recently reopened a case on which I operated three years ago. At that time I relieved a typical sigmoid adhesion and the patient was well for two years. I have just done a hysterectomy on this patient for double pus tubes, which had taken three years to form. The sigmoid adhesion was not the sole cause of

pain, and she was having a beginning salpingitis, which could not be recognized by the naked eye. Those cases will happen and they are difficult to diagnosticate.

In regard to Dr. Bovée's question about stitching the sigmoid, I should say if we stitch the sigmoid centrally to any organ we probably would straighten it out and not produce a kink at the point where adhesion is likely to occur.

PROCTOCLYSIS: EXPERIMENTAL STUDY

By Hugh H. Trout, M.D.
Roanoke, Virginia

A preliminary announcement of this experimental work was first reported February 12, 1912. Since this time the facts contained therein have been further confirmed by an increased number of cases and more information ascertained.

A brief synopsis of this primary report is about as follows: The work started with the idea of comparing the effects of plain tap water as against normal saline solution per rectum and this series covered nearly 1000 cases.

The present report contains a few over 2000 cases. In other words, every patient who has an operation is given by rectum either tap water or normal saline solution. Of course, operations on the rectum and perineum have to be excluded from using proctoclysis. With these exceptions this list contains a vast majority of all the operations of surgery and gynecology and it is interesting to notice by alternating the cases as they leave the operating-room how evenly they are divided into different classes in the final summary.

The anesthetics have been nitrous oxide and oxygen, ether, chloroform, and cocaine.

The method of proctoclysis is the same as described by Murphy, except in the place of the hard-rubber nozzle we employ a small soft-rubber catheter and count the drops

per minute by means of a visible dropper first described by Lawson.[1]

We have not been able to introduce the large amounts of water or normal saline solution such as Dr. Murphy[2] reports, 9 quarts in twenty-four hours, except in a few of our drainage cases and in patients whose resistant power was so low that the hard-rubber plug was not painful. In the vast majority of our cases the presence of the soft-rubber catheter was not even known to the patient.

Inquiry has been made of most of the larger hospitals in this country, both as to the method of preparing normal saline solution as well as their reasons for using the same in place of plain tap water for proctoclysis. Replies were received from 232 hospitals and the manner of preparation varies from careful attention to the most minute detail, and containing potassium, calcium, and sodium chloride in varying proportions, filtered and sterilized, to the simple placing of two teaspoonfuls of table salt to one quart of tap water. In other words, the replies show there is no uniformity in preparation and in most of them the solution is not isotonic with blood. A teaspoonful of salt may be anything from 115 grains to 270 grains, depending upon whether it is a "heaping," "level," or anything in between the two.

Taking a series of tubes, each containing 2 c.c. of sodium chloride solution of strengths varying from 0.1 per cent. to 5 per cent. and placing in each one drop of blood we find hemolysis to occur very sharply at two limits. The lower being between 0.5 per cent. and 0.55 per cent. The higher being between 1.1 per cent. and 1.2 per cent. Apparently hemolysis takes place at the lower limit by first liberating the hemoglobin and then followed by the destruction of the cell; while at the upper limit there is first crenation and finally destruction of the cell. Mention of this is simply made to call attention to the fact of so many solutions

[1] Jour. Amer. Med. Assoc., April 18, 1908.
[2] Ibid., April 17, 1909.

being employed intravenously which are far removed from safe limits. This statement is based on the replies from a number of hospitals, indicating the employment of the same strength solutions intravenously as per rectum.

Following the directions of preparations given by the majority and using the amount of fluid said to be absorbed from the rectum by many we would be forcing into an already weakened patient in the space of twenty-four hours, the average amount of salt consumed as a condiment by a normal man in one month. Some replies contend salt solution is less irritating to the rectum, but we find the reverse to be true.

The vast majority of the replies indicate the necessity for a chemical similarity or isotonicity with blood. Of course, if osmosis plays any part in absorption from the rectum, which the majority of authorities deny, the higher the tonicity of the blood and the lower that of the solution, the quicker will the solution be absorbed. One reply suggested that water might "dissolve out the salts from the cells of the epithelium which takes on water to such a degree that the cells themselves actually burst. Salt solution prevents this and is absorbed without any destruction of the epithelium." This theory is not based on any experimental work or proof of any kind. We have now employed water in over 1000 cases and in no case have we been able to see anything to indicate a destruction or irritation of the epithelium.

Even we surgeons know of the wonderful improvement in some patients with nephritis when placed on a salt-free diet, and all of us realize there is a transient renal irritation or possibly a nephritis following the majority of anesthetics and infections. In 7 cases in our series the following coincidence has been observed: A transient albuminuria remaining in every specimen for two days after an anesthetic when using salt solution per rectum. Water was then substituted and at the end of twenty-four hours the albumin had dis-

appeared. At this time a return was made to salt solution with the appearance of albumin and a few hyaline casts in from six to twenty-four hours. Patients were then placed on a limited salt diet and the urine in every case promptly returned to normal and remained so until discharged from the hospital. In none of these cases was there any edema.

An attempt was made to ascertain if there was any difference in either the time of appearance or amount recovered after giving a hypodermic of phenolsulphophthalein (Roundtree-Gerherty method) after first obtaining what was apparently normal for that individual patient and then giving first water and later salt solution per rectum, and vice versa. In all our cases both factors remained practically constant, but our experience is far too limited to justify any final deductions on this point.

The estimation of the sodium chloride content both in the blood and urine presents too many uncertainties to be of any practical value.

The association between sodium chloride and the kidneys is too well known to require further comment.

Personally, we believe surgeons have simply drifted into employing salt solution per rectum without giving any serious consideration to what they were doing and such is our excuse for this paper.

In this entire series in both the salt and water cases there have only been 121 who complained of being thirsty, and of this number, 112 of them were salt cases. There were 27, or over one-fourth of these cases, complained of tasting salt when they had absolutely no way to know they were being given saline per rectum, and the solution being prepared so as to be 0.06 to 0.09 per cent sodium chloride. Furthermore, the water cases have taken one-third more fluid per rectum than the salt cases and the latter have required nearly twice as much water by mouth to relieve thirst.

In addition to this there have been 58 cases who have

been previously operated upon one or more times in other hospitals and they have all commented, without suggestion, on the absence of thirst and decrease in nausea which were the prominent features of the previous operation from the patient's viewpoint. Of this series, 32 were given water and 26 salt solution per rectum.

During the time of this series there have been 287 operations upon the rectum and perineum which have been under exactly the same routine with the exception of not employing proctoclysis, and, with the exception of 5, they have all complained bitterly of thirst.

We can see no more reason for the giving of salt solution per rectum to prevent and relieve thirst than we can for its employment by mouth under like conditions and, furthermore, have noticed when given per rectum it sometimes produces the same nauseating and slightly toxic effects it does after drinking.

There have been two cases[1] reported in literature which have terminated fatally by employing a strong stock solution of sodium chloride, carelessly substituted for the physiological solution, and Evans[2] reports two additional cases in which death was actually produced by the use of the physiological salt solution.

It is true sodium chloride is the least toxic of the group of similar metal chlorides, but even at that it is a poison to all people when given in large doses and occasionally very toxic in small doses to a certain class of cases, and we believe this peculiarity is apt to be present in patients whose resisting powers are lowered by operations and infections.

Certainly our observations convince us this is not only a theoretical but a most practical fact and one worthy of more consideration than has been usually given to it in the past.

[1] Harlow Brooks, Archives of Internal Medicine, November, 1910, and O. H. Campbell, Journal of American Medical Association, October 5, 1912.

[2] Journal of American Medical Association, December 30, 1911.

Finally, we know the giving of fluid per rectum meets Nature's post-operative demand for the relief of thirst in a simple affective and harmless manner and to those of us who have been operated upon, no other comment is necessary; to those who have yet to be operated upon let us hope they will be spared the usual appeals for water, by insisting upon the employment of proctoclysis.

DISCUSSION

Dr. J. Wesley Bovée, of Washington, D. C.—I merely wish to congratulate Dr. Trout on his work in this direction, because it is thorough and painstaking, and I will say I am much surprised at his results. I had no idea he would get nearly as good results with the water as with water containing salt, and I have had quite a large experience in the use of salt solution. I for one appreciate very much the paper he has presented to us today.

Dr. Ernst Jonas, of St. Louis.—I wish to say just a word on this paper. Since March of this year, after the preliminary report of Dr. Trout came out, we have been changing from saline solution in the rectum to water proctoclysis, and although I cannot give exact statistics, I can confirm the very favorable report of the essayist. The patients have been comfortable; edema of the legs has been observed much less frequently.

Dr. George W. Crile, of Cleveland.—I have learned much from the admirable paper presented by Dr. Trout. I would like to ask Dr. Trout whether in the course of his investigation he has had any opportunity of ascertaining whether or not there are any changes in the epithelium of the rectum.

Dr. Alexius McGlannan, of Baltimore.—We have had some experience with Dr. Trout's tap water proctoclysis, and have found it satisfactory. I would like to know if he has had any experience with tap water hypodermically. I do not think the toxicity of salt solution has been proved. We give salt solution intravenously and hypodermically to patients who are extremely ill, and we do not see any serious after-effects. The advantage of tap water proctoclysis in our experience seems to be in its simplicity and in the relief of thirst.

Dr. F. W. McRae, of Atlanta, Ga.—I wish to thank Dr. Trout for his excellent paper. I have been very much interested in it, and I rise to add another case of death from the use of the stronger salt solution. The patient was not mine, but I know of it, and in this case, instead of the usual dilute salt solution, a stronger solution was given and death supervened twelve hours later. The operation was a simple appendectomy following which the nurse used a pint of the strong salt solution.

Dr. W. F. Parham, of New Orleans.—I have for some time been using in many of my cases a very much weaker solution, $\frac{2}{10}$ of 1 per cent. solution and frequently plain water in place of the ordinary normal salt solution, but I have not done it as systematically as Dr. Trout has done. It seems to me, he has brought out very clearly the advantages of using water in place of salt solution in most of these cases. I want to ask him in closing the discussion to say something about the mechanics of the drip. I have had some difficulty in getting the salt solution absorbed in sufficient quantity. The catheter is used most frequently with us, but the nurse frequently complains that the water is discharged. Murphy has shown that it is due to the escape of the water because the gas cannot pass readily into the catheter and so must go through the anus carrying the water with it. I just call attention to that point as I think it is of great importance.

Dr. Walter B. Dorsett, of St. Louis.—I would like to ask Dr. McRae regarding the symptomatology in the case he referred to, and whether he does not think that death was due to the operation performed rather than to the normal salt solution.

Dr. McRae.—I cannot speak with any great degree of definiteness because I only know of the case as having occurred in the hospital. The surgeon who did the operation is a good clean operator and he simply did an appendectomy. There was no reason to believe that the trouble was due in any way to the anesthetic or to the operation. This large quantity of the stronger salt solution was given, within a short time serious symptoms developed, followed by a chill and temperature of 106°, and death ensued in about twelve hours. I simply know of the circumstances. No autopsy.

Dr. J. M. T. Finney, of Baltimore.—In the opinion of the Chair this is a real contribution. I have had opportunity of seeing some of Dr. Trout's work and know the care with which

these observations have been made. The long series of cases which they cover renders it a paper of extreme importance in view of his findings. The Chair is anticipating some remarks he proposed to make this afternoon, but while we are on that subject I wish to call attention to this fact, namely, the question which came up incidentally yesterday in the matter of eserin. We surgeons are human; I trust most of us are, and we have the same feelings common to the human race, namely, we get into a certain habit and routine, and unconsciously acquire certain fads, as it were, or certain fancies which we follow along until something happens. Then our attention is called to the fact that we have been doing something for a long period of time. Why, I do not know. I have been doing it the same as the rest of you. And that is the case with salt solution.

Not long ago, in investigating this question, there were revelations sufficient to cause us to "sit up and take notice." We all know that salt solution does good. I believe the contribution of Dr. Murphy regarding the continuous irrigation with salt solution is one of the greatest life-saving procedures that has been introduced within my surgical lifetime. Certainly, in the question of abdominal work, I know of no one procedure which has seemed to me to be of greater importance or more far reaching in its results than the question of proctoclysis.

What is the best solution to use? Are we going on blindly using salt solution because somebody else says so, or because there is the weight of authority that it is the thing to use when maybe something else is better? This work of Dr. Trout is well worthy of our careful consideration and trial.

I have had occasion to see some of the bad results of salt upon the kidneys. I have also seen in one or two cases acute edema of the lungs which was apparently due to the introduction of large quantities of salt solution. In investigating this matter in one of the hospitals with which I am connected we found that the house officer or pharmacist had gotten the formula mixed, instead of using physiological salt solution we found that we had been using something else for two years. The point I want to make, and it is the same with regard to eserin, is this, if we leave the after-care and treatment of our cases entirely to house officers, and let everything be done by rote, without adopting our treatment to the individual case, we will often get into trouble.

I think this paper of Dr. Trout will have a very excellent effect in two ways: (1) In directing attention to the fact that proctoclysis is a good thing. That we will all admit. (2) What is the best solution to use? What solution will give the best results? After my attention was called to this matter by Dr. Trout I had occasion to compare salt solution and water, and as far as my experience goes, which is not as extensive as that of Dr. Trout, his conclusions are entirely correct, and my experience has borne out all the points he has made in his paper.

Dr. Robert Milne, of London (by invitation).—There is one practical point which I should like to hear discussed by Dr. Trout in his closing remarks, and that is the temperature of the tap water in the receptacle. We, at the London Hospital, like the surgeons at the Johns Hopkins Hospital and in other hospitals, are victims of routine, and for years we gave saline solution, and its temperature in the receptacle was said to be 115° until someone came along and, in allowing the saline solution to run at the same rate the patient was receiving it, found the saline came out the end of the catheter at a temperature of about 90°, that is, coming along a rubber tube 3 or 4 feet in length, the saline solution dropped about 20 degrees of temperature. Since then we usually keep it in a thermal flask at the bed, and keep it in that flask at a temperature of 120°.

May I also say a word with regard to another question. With regard to the question of saline, recently in giving salvarsan to patients with specific disease we found that such a lot of them were getting rigors and severe after-effects, due to the administration of the drug. We were making the salvarsan with ordinary boiled water. Some one suggested that the cause of the rigors was simply due to the dead bacteria in the boiled water, and as soon as we took double distilled water there was a large decrease in the number of dead bacteria, and we have not had a single rigor after the injection of salvarsan since.

Dr. Bovée.—I am led to make a few remarks after the suggestion made by Dr. Milne. Realizing there was a difference between the temperature of the solution in the reservoir and that going into the patient either in the vein, under the skin, or in the rectum, about eight years ago I devised a thermometer which consists of a glass tube about 8 or 9 inches in

length through which the solution was to run, and in that tube is placed a thermometer. This thermometer will register up to 200°. The mercurial end of the thermometer is placed near the needle; if it is a subcuticular injection, or if it is going into the rectum, it is placed nearest to the anus in the tube; about 2 inches from the exit of the fluid into the body is the mercurial end of the thermometer, and the solution which runs through the glass tube has to go around the thermometer to get through. We found in giving salt solution by hypodermoclysis there was a difference in the temperature of the solution in the reservoir, and that near the end of the tube, according to the registering thermometer, this difference being anywhere from 11 to 25°. To overcome that difference in temperature, we ran the rubber salt-solution tube through basins of water or hot water bottles, placed close to the tube, and guided entirely by the registering thermometer near the exit of the tube. That little thermometer is in use largely in Washington and is on the market generally. I have never before publicly described it.

Dr. O. H. Elbrecht, of St. Louis.—There are one or two points in connection with temperature that I would like to bring out. I have done considerable work in an experimental way, and regret very much I did not hear the paper. As to the temperature changes, if you will take a tube 6 feet long, which is about the average length tube that will be used in proctoclysis work, you will find there is a drop of 40° in the 6 feet of rubber tubing, that drop running at the rate of 60 drops per minute. That we simply used as a standard to gauge how much salt solution would run in an hour. That only applies where the drop method is used. Where we use a continuous flow and did not have the drops regulated, it depends upon the absorbing power of the patient. Some of them will absorb a few ounces in an hour, while others will absorb a pint and a half, which is the largest amount I have ever seen absorbed in a single hour. If you will bear in mind that you can keep a line on the temperature, you should have the salt solution or water in a reservoir. The theromometer that Dr. Bovée spoke of we use and I think it is a practical arrangement for hypodermoclysis, but we did not find it so for proctoclysis work. If you are using a return flow in this work, this thermometer will plug the particles of fecal matter that are picked up. If you will bear in mind the drop in the

temperature, you will be more apt to get the water delivered in the rectum at the proper temperature. We had to work that out in a little scheme which I had something to do with when Dr. Murphy brought his paper out on proctoclysis, maintaining a uniform temperature. I do not think you will see as great a variety of apparatus in any one field of work as you will see in the administration of proctoclysis. You will see it in every form. You will see it from an electric light which is put directly into the water, to water bags on the outside, etc. This one question must be remembered: If you keep the bulb in the water when you start out you have a quart of solution; you have it at that temperature. The greater the absorption the less water there is in the reservoir or in the receptacle, consequently the higher the temperature. You will have patients who complain of proctoclysis. They have complained for two reasons, namely, from irritation of the rectum and from the heat, and you have to withdraw it at times because of too great a heat. That point is lost sight of. With the decreasing amount of solution, the solution is getting hotter, and for that reason I was induced to get up an electric heater, which is on the market, but we finally came down to having a reservoir or container for the electric heater which heats 6 drams of fluid at any one time. The electrical unit is uniform in the heat it gives off. It is the only arrangement that I know of that will maintain absolute uniformity in the heat. The other ones will vary because you have constant heating elements and a constantly changing water in the receptacle. If the water is discharged into the rectum at the proper temperature you get greater absorption.

I want to mention one point in connection with the use of salts. One of my colleagues in St. Louis has recently had an experience that bears out the toxicity of chloride of sodium. The mother of a boy, aged three years, had been told that the boy had pin-worms, and she had been told that an injection of salt solution into the rectum would cure them. She took a cupful of salt to a quart of water, stirred it up and injected it into the boy's rectum, and three hours later the boy was dead. He died in convulsions.

Dr. W. P. Carr, of Washington, D. C.—I have listened with pleasure to this paper. It is a valuable one, and I want to compliment Dr. Trout on the manner in which he has written it. I am very glad he has brought it to our attention.

I have always been rather afraid of salt solution, especially used intravenously and subcutaneously. I have never given it intravenously, and seldom use it under the skin. It is valuable in the rectum. But if we can get the advantages of it with tap water and avoid its disadvantages this seems to be the proper thing from a rational point of view. To relieve thirst we should not put more salt into the patient.

With reference to the question of temperature, I doubt whether it is necessary to have any exact temperature for the water. If we give a patient water by the mouth, we are not particular about the temperature, so it is not very hot or very cold, and why not the same with the rectum. It may be true, there is a slightly greater absorption if the water is the temperature of the body, but I have never noticed it, and if a patient is having a rise of temperature I should think it would be better to have the water cooler than the body temperature rather than hotter. I have noticed no difficulty about retaining water in the rectum at ordinary room temperature if given slowly by the drop method. Each drop going into the rectum almost immediately gains the few degrees of heat necessary to bring it to the body temperature.

Dr. Trout (closing).—I am certainly glad to hear from Dr. Crile. As to the correspondence between my assistant and one of your assistants, Dr. Messinheimer, I will say that shortly after that correspondence we started considerable experimental work on dogs. We had to get the dogs from the pound, through the Police Department. Everything went along smoothly until the ladies of the Society for Prevention of Cruelty to Animals made it uncomfortably hot for the Police Department and stopped our experimental work. We did not come to any conclusion except that we would have to postpone all animal experimentation in Roanoke for the present.

Dr. Fischer, of Cincinnati, who has been doing work on acidosis, has experimented with sodium bicarbonate in the rectum of dogs, but I am not familiar with the results of that work as far as the irritation of the rectal mucosa is concerned.

We have never tried the use of water hypodermically. I do not know what effect it would have, but should not think it would be safe in that manner and certainly not when given intravenously.

In reply to Dr. Parham's question, I stated in my paper that we have not been able, except in a few cases to get 9 quarts of salt solution into the rectum. We find that the drainage cases absorb more than any other class of cases. We have used from 3500 to 4000 c.c.; that is about the average in water cases, and salt solution from 2500 to 3000 c.c. in every twenty-four hours and continued for four days.

As to the mechanics of the method, there have been two hundred and ninety-three various parts of apparatuses described for proctoclysis. By using a small rubber catheter we give fluid over a period of two or three hours, let it run in at a rate of 60 to 150 drops per minute, depending upon whether it is being absorbed or not, then cut off the fluid for one-half hour and start it again. In this manner it is convenient for the nurse, the patient obtains sufficient fluid and is not aware of the presence of the catheter.

In reply to the question of Dr. Dorsett as to how we know these patients, reported to die of actual sodium chloride poisoning, did die of the same, will state postmortem examinations were made in the cases of Dr. Brook, Dr. Campbell, and Dr. Evans, and they showed changes in the liver and spleen similar to those we get in the lower animals from poisoning by sodium chloride.

The question of temperature is a large one. We find, for instance, if you take a low temperature of 60° F. and let the solution run into the rectum, you practically get no absorption, and it is distinctly irritating to the patient if you give about 500 c.c. at this temperature.

The apparatus which is most satisfactory is the Elbrecht apparatus for heating and maintaining the temperature of the solution. However, simply allowing the rubber tube to go between two hot water bags placed several inches away from the patient's leg with a folded blanket between so as to prevent burns, will suffice. I believe this answers all questions asked and I certainly thank you all for the kindly reception you have given this report of our clinical observations.

HEAD INJURIES: CLINICAL REPORT

By Ap Morgan Vance, M.D.
Louisville, Kentucky

In the thirty-five years of my active surgical career it has been my fortune to attend many cases of injuries to the head. Thinking probably a clinical relation of a few might be of some interest, I chose the above title, picking out 8 cases from whom I had saved the specimens of bone removed.

Case I.—J. McC., a man of splendid physique, aged forty-five years. The history culled from this man and his father who brought him to me was this:

Twelve years before, when on a spree in New Albany, Indiana, he had a fight in a livery stable and was struck on the right side of the head, about half way between the ear and median line, with an iron shovel, a scalp wound resulting. He was unconscious for three days and for three months was paralyzed on the left side, but recovered and was able to work on the farm. Epilepsy of a severe type developed, to render his life more or less miserable, the attacks being oftener and more severe when he was drinking. Two months before he called on me, while in his cups, he went to the same stable where twelve years before, he had been hurt, and asked for the man who hit him. He was directed across the street to a rival livery stable, being told as a joke that a man there was the one he was looking for. He crossed the street, picked up a heavy iron rake and brained the fellow indicated. After lying in jail for the above period, he was brought to me. I advised, after an examination, that his head be opened, the site of the

trephining being under the scar, the centre of which was very tender. I put him in the St. Joseph's Infirmary and arranged for the operation at 8 A.M. the next morning. About daybreak, the Sister Superior telephoned that the man was crazy and was so violent she could not manage him. He was removed to the City Hospital and this button (Fig. 1) was removed with an old fashioned trephine, the exquisitely tender point being taken as a guide. After the button was loosened it still hung, and on removal gave evidence of being roughened. The dura also was rough and bleeding when the bone was lifted. The man recovered quickly, had no more epilepsy, and after leading a much better life, died of pneumonia, ten years later.

A few days before he came to me, while in jail, he backed up against a hot stove and burned the end of his left thumb very severely. This did not disturb him at all, until after the operation, when he complained that it was no longer numb, but pained him badly. A funny thing occurred at my last interview with this man. I sent him a bill for $250, and when he came to bid me good-bye and was about to leave, he remarked, "By the way, Doc, I owe you $2.50." This was just that much more than I ever received—a very common outcome of such cases. This man was acquitted of the charge of murder on my testimony that he was irresponsible, partly from the fact that he was drinking, but also in consequence of the old injury.

CASE II.—Judge X., a distinguished jurist, ten years ago, came under my surgical care in consultation with Drs. Thompson and Koehler of Louisville. He was forty-five years old. The history obtained was, that while on a trip to New York, he was lost. When finally discovered by his friends, he was minus watch and money and otherwise much the worse for wear. While on the train coming west, he was thrown against a sleeping car birth, striking his head. For three weeks after getting home, he seemed somewhat dazed. He would call on friends and go about, but seemed

forgetful of passing events. Two days before I was consulted as to the surgical possibilities for relief, he had gradually lapsed into a complete coma, with complete paralysis, the left side becoming paralyzed first, then the whole body, including the face, which was drawn to the left side. Sensation to the whole left side was entirely absent, a little being left on the right side. Bowels and bladder paralyzed, eye reflexes absent, exaggerated stertor with every evidence of approaching dissolution. Pulse 150, temperature 103° F. He was removed at once to St. Joseph's Infirmary, after the consent of the family had been obtained to the forlornest of forlorn attempts to save his life by opening the skull. After the scalp had been shaved, the head showed a curious condition, the whole scalp was edematous, but the right half in addition, presented the appearance of an angioma, the veins were so greatly dilated. Very little anesthesia was needed and with a chisel, a piece of bone as large as a dime was quickly removed (Fig. 2), the resulting opening being rapidly enlarged to the size of a half dollar with rongeur. The dura bulged decidedly, with no pulsation evident. The dura was incised and the brain explored with a long suction needle, a moderate amount of fluid being obtained each time, possibly half an ounce or more altogether. The man was put to bed after the wound was closed with drainage, the family being told he would be dead within a half hour. It was about eleven o'clock at night when he was returned to bed and the nurse was told to call me if needed. At eight o'clock the next morning, when I met her in the hall and asked her what time he died she laughed and said he was all right and had just had a drink of water, holding the glass in his left hand. This man made a rapid recovery and in a few weeks was as good as new and has held responsible public positions in the line of his profession ever since. The only sign of his trouble left is an occasional twitch about the left side of the mouth. What pathology existed in this case I do not know. I looked

up all the literature and the only condition resembling it, is what is designated by two or three authors as "wet brain." I believe it was really a case of obstruction of the venous return at the base and that the decompressing operation caused the brain to resume its work. I also believe that the withdrawal of the fluid had something to do with this result.

CASE III.—Some fifteen years ago, I was called to attend a white boy, aged ten years, who had a few minutes before been injured by a street car. A companion had thrown this boy's cap in front of an approaching car and in the attempt to recover it, he had been knocked down, the front of the car passed over him, being stopped when his body was under the front trucks. The car was lifted and the boy crawled out and walked to the curb. After being carried one square to his home, I saw him. He was terribly shocked, but after an hour he reacted, and upon examination I found his scalp had been torn from both sides of his skull. While I waited for the boy to come around so I could examine him, this right parietal bone was brought in. It had been found in the street. The left side of the denuded head was filled with street dirt; the right from which the bone came was clean. A strip of scalp down the centre was left attached and separate dressings were applied, after cleaning and adjusting the parts as best I could. This boy was hurt on December 13, and I attended him until Christmas morning, when the father became drunk and insisted on my soaking the dressing off. When I declined, he discharged me and the doctor who was called in, did soak the gauze to make it come off more easily. The uncovered meninges became infected, and the boy died three days later. I feel certain, if this case had been handled properly, this boy would have recovered, as he was in good condition when I was discharged. Fig. 3 shows the bone.

CASE IV.—Patient, J. F., white, male. While playing baseball in a town in Southern Indiana, was struck on the head, just above the left ear, by a ball thrown by the pitcher.

He immediately dropped as though he had been shot, and was unconscious for a short time. He was removed to a neighboring drug store and, some time after midnight, boarded a train for Louisville. Upon arriving there, he walked a distance of six or eight blocks to his home and went to bed. He did not get up the following morning as usual, and his wife noticed that he was irritable and restless. She sent for Dr. W. A. Keller, who found the man irresponsive, but upon persistent questioning he showed some intelligence and pointed to the right side of his head, just about the middle of the parietal region. Dr. Cecil was called and advised that a surgeon be consulted. The man had been injured on Sunday, and Dr. Cecil saw him on Monday afternoon. I was called to see him on Thursday and advised opening the man's skull. By that time the patient had become very restless and almost uncontrollable. My suggestion was declined and they subsequently called Dr. Wm. L. Rodman who also advised operation, which they again declined. The patient went along for about nine weeks, at the end of which time I was again called to see him, and found simply a living skeleton. All these weeks his wife had fed him, with a spoon, whites of eggs, milk, gruels, etc. The sordes filled up his mouth so that even broths could hardly be gotten through it. I again advised operation, and after a few days he was removed to St. Joseph's Infirmary. With an osteotomy chisel I removed this button of bone (Fig. 4). His pulse was very slow and weak, and his eye reflexes were almost entirely irresponsive, and, altogether, he looked like a dying man. About the time I had gotten this button out, Dr. W. C. Dugan came in and remarked: "Hello, Vance; aren't you ashamed to operate on a dead man?" The pia mater looked almost exactly as if soot had been dusted on it with a pepper box. I wiped all of this out and closed up the wound with drainage. He was put to bed more dead than alive. His wife stayed with him, and fed him drop by drop, and at the end of three

weeks he went home, where I saw him occasionally. The wound healed up kindly. He got so he could sit up in a chair and one day when I was there he looked up and asked: "Who are you, and what are you doing here?" I told him I had fixed his head. That was the end of the thirteenth week after the injury. He recovered completely and is now working at his old trade as a moulder in a foundry. He remembered nothing of the accident.

CASE V.—Boy, aged ten years, while playing in a ditch dug under a street car track, raised his head just as a car approached. The baby catcher struck him back of the right ear, producing an extensive compound, comminuted fracture of the skull, the mastoid region and the area back of and above the ear being crushed. The lateral sinus was uncovered for an inch. The boy crawled out of the hole and walked a square to a nearby physician, who called me. The pieces of bone shown in Fig. 5 and several other pieces, since lost, were removed, the edges were smoothed up and the scalp sutured over the opening without drainage. The dura was not injured. The boy had no focal signs and quickly recovered. He wore a firm leather shield over the large soft place for several years and finally the tissues overlying became firmer and this protection was dispensed with. He is now a young man, and only a short time ago, I was applied to by an insurance company to know if I considered the old injury as a modifying element in connection with an insurance risk.

CASE VI.—A young man, aged twenty-seven years, who was landed at my office unable to walk without assistance, and unable to talk so as to be understood, being paralyzed on his right side, with contractions of both arm and leg. He had an ordinary express tag pinned to his coat which read, "Take me to Dr. Ap Morgan Vance, 218 W. Chestnut Street." After struggling with him for some time, in an ineffectual effort to learn something of his antecedents, he mentioned the name of a minister friend of mine, who

lived in Russelville, Ky. After getting him into an infirmary, I wrote to this gentleman, who wrote me all he knew of the case and enclosed a letter from the man's mother, giving the history that five years before he had been assaulted, being struck over the left eye with a sling shot. He had suffered with epilepsy and had lost his speech and power of locomotion, soon after the injury. The letter gave me permission to do what I thought best in an effort at relief. Examination revealed an old depression over the left brow and temporal region. I endeavored to do a bone flap operation, but the brain bulged so much after the dura was incised that I found this impossible, so removed this piece of bone (Fig. 6). The brain was covered with soot-like material, evidently what was left of an ancient clot. The dura and scalp were replaced with abundant provision for drainage. The drainage was very profuse for days, soaking the voluminous dressings that were frequently applied. The bulging brain receded, so that a great depression resulted. A few days only elapsed before this man began to talk. Before he left for home, at the end of four weeks, he could walk with comparative ease. Later, news from him said that the epilepsy was cured, and the man was able to work and earn his own living, the paralyzed and contracted limbs greatly improved.

Case VII.—A young man, very despondent over a love affair that did not run smoothly, decided to end it all. He uncoupled the barrel from the chamber of a long 38, Smith & Wesson revolver, placed the shortened pistol on top of his head and pulled the trigger. He then walked down from the third to the first floor of his brother's home, into the midst of the family, who were at dinner. His brother took in the situation and telephoned to me to meet him at the infirmary. I was ready when he arrived there and he was brought to the operating room sitting upright in a rolling chair. He was perfectly intelligent and able to walk. An effort had been made to deceive me by the

Head injuries.

story that this chap had fallen down stairs and cracked his skull. Under the anesthetic, the head was shaved, revealing a large stellated wound on a line with the right eye, about the junction of the frontal with the parietal bone, blood and brain matting the hair. Lifting the powder burnt scalp, a hole in the skull was shown, large enough to easily admit my thumb, the cleaner looking pieces shown in this bunch of bones (Fig. 7) were found with the sliver of lead. The darker fragments were removed, with much brain matter and hair, from deep down near the base, forceps guided by the finger being used. No more fragments of lead were discovered. The great cavity was cleaned out with strips of gauze, the wound closed without drainage. Coaptation being incomplete, this was not necessary. The man rapidly recovered, and regained his usual health, which had been below par. He had no focal signs whatever. He very soon married the beautiful girl in the case and I think has more sense than before. The "falling down the stairs" story went with the public, and he holds the responsible position he held before.

Case VIII.—Man, aged fifty years, a great sufferer from asthma, and also from business reasons, placed a 38 caliber pistol in his mouth and was found by his wife in the bathroom, only partly unconscious, a moment after the report of the pistol rang out. I was called by Dr. C. W. Hibbitt, the family physician, within half an hour. Examination revealed a large hole in the roof of the mouth, a little anterior to the junction of the soft with the hard palate, and just a little to the left of the median line at the top of the skull was a little bunch giving evidence that the bullet had gone entirely through the brain. The left eye protruded and subjunctival echimosis was marked. We did nothing, thinking that the man would surely die promptly, but he did not. The mouth was attended to by antiseptic sprays and liquid nourishment given. Six weeks passed. The mouth wound healed and the man showed only moderate mental hebetude.

This seemed to be getting a little more marked and I advised the removal of the bullet, which was done, along with several pieces of skull, two of which, with the bullet, are here shown (Fig. 8). This man is as well as ever, except the left eye is sightless. He still has his asthma, and is shy about going out. He goes down town, but had not returned to his business at the end of a year and a half. I have seen several of these cases of brain wounds by the oral route, but this is the first one I have ever seen that did not pass out immediately.

I suppose every surgeon has such head injuries to handle, but I thought these would illustrate one point at least, that is, that no hope is too forlorn to give a chance. I have been many times criticized for operating on dead men, but some of those dead men are now alive and useful men, and this with me always clinches the argument—self and surgery should be sacrificed in giving almost any forlorn hope case the benefit of the doubt.

DISCUSSION

Dr. Charles E. Caldwell, of Cincinnati.—While the recital of these cases by Dr. Vance is very interesting, this question of shooting through the mouth reminds me of one case that occurred in the last year in the Cincinnati Hospital in the service of one of my colleagues. A man shot himself through the mouth with a large caliber revolver—I will not say it was thirty-eight, but maybe thirty-two—the bullet passed up through the roof of the mouth, came out here (indicating), passed directly between the cerebral hemisphere, and the man not only recovered, but had no symptoms. He made a most remarkable recovery. He was at no time unconscious, and at no time did he show any serious symptoms or any cause for apprehension, so that I report this case just incidentally. We have a great many of these cases necessarily at the Cincinnati Hospital in a city with a large colored population. I report this case because it is unique and shows that a man may get a serious wound through the mouth and up through

the roof of the mouth, through infected cavities, such as the nose, and yet have no symptoms resulting.

Dr. O. H. Elbrecht, of St. Louis.—I was very much interested in the report of the case of bulging brain. We have all opened skulls and have seen the brain bulge to such an extent that we have been worried about it, particularly as to how we were going to get it back. One of my recent experiences was the most gratifying I have ever had, and until the doctor cited some of his cases where he was reviving dead men, I did not suppose such results could be obtained. What he has said is again an argument in favor of operating on these cases before they become so far advanced so that we can give them at least one chance for recovery by operation. The patient was a man who was connected with Ringling Brothers' circus. In a railroad wreck he was injured on one side of the head, sustained a slight compression, and made a recovery from that, and was discharged, but developed paralytic symptoms some time afterward. These symptoms came on very rapidly, and within ten days' time he was hemiplegic, lost his speech, lost his hearing, and developed a terrific thirst. While he was conscious, with these symptoms he managed to hobble around and hang onto anything or everything. In this case the same complications came up. The brain bulged more than in any case I have ever seen. The dura was opened and it was impossible to return the flap. I made a large osteoplastic flap over the motor area, and then tapped about 3 ounces of spinal fluid and it gave great relief in the amount of pressure. After that we were able to replace the flap by chiseling off the hinge, leaving the bone intact on the scalp, but detached on four sides. There were few dural adhesions, showing an organized clot. This man had a complete recovery of all symptoms within ten days' time. He was able to hear perfectly in two days. The last paralysis to clear up was the finger drop. I let him sit up in bed. One morning when I called to see him he said, "Good morning doctor," and held out his hand which the day before was paralyzed, and he grasped my hand so tightly that I squirmed. He was a very strong man. He wanted to show how effectively he could use that hand. Three weeks after the injury I expected to get the usual cerebral hernia and lack of symmetry, but within three weeks' time with that loose flap there was perfect symmetry of the head. Just what causes the water-logging spoken of must be worked

out. These symptoms come on within a short time and suggest thrombosis of the bloodvessels. The injury was on one side and the counter pressure was on the other.

Dr. Henry O. Marcy, of Boston.—The distinguished Hunter McGuire of Richmond, Va., related a case to me which I presume has not been published. He reported it to me *in extenso* some time after the operation. During the seven days conflict about Richmond during the Civil War this man was wounded; he had a depression of the skull, and he never spoke afterward for thirteen years. He was confined to his room. He walked persistently about the room with his left elbow projected until he had worn a groove around the entire wall. He had taken his food as usual, but was purely animal in all instincts and conditions. Dr. McGuire removed a section of the bone, and at once on waking from the ether he said, "Where is the army moving today?" He made a recovery which was not complete, but in such a way that he was quite able to support himself for years afterward. This case is very interesting as showing that thirteen years had elapsed between the injury and the operation.

Some of you know, in the history of brain injuries, of the celebrated case that occurred near Boston before my days of tutelage, called the "Dr. Harlow case," because under the care of Dr. Harlow, of Woburn, Massachusetts. The man was tamping a drill-hole with an iron rod three feet long, charging a drill-hole, and in the process the explosion occurred and the iron rod struck him below the jaw and was carried directly through the brain, removing a large section of the skull from the top of the brain. The remarkable thing about it was the man recovered and lived for years, dying in California. The skull was obtained with much difficulty and it is now in the medical museum in Boston, showing a very large defect of the bony structures. It does not seem possible that recovery could have occurred.

I presume all of us have had cases of remarkable recovery following what we considered most serious injury. I recall a long series of operations of various sorts following the Civil War. It is interesting to know what tracts of the brain may be so injured that we think death is going to follow immediately, yet possibly recovery may take place.

I am personally under obligation to the reader of the paper for bringing these cases to our attention because they are highly instructive and of great practical importance.

ACUTE INVAGINATION OF THE ILEUM SECONDARY TO SARCOMA OF THE SMALL INTESTINE

By C. Jeff. Miller, M.D.
New Orleans, La.

Tumors of all types, benign and malignant, are rarely observed as primary growths in the small intestine. Malignant growths are the most frequent and of these sarcoma constitutes the predominant type.

Moynihan collected 40 cases in 1906, and Lecéne in 1907, found records in the literature of 89 cases. These two tabulations seem to be the most complete yet published. From the time of the appearance of Lecéne's article up to date, 26 other cases were reported, making a total of 115 cases. A study of this material is exceedingly interesting from both the pathological and clinical standpoint.

In 46 of Lecéne's cases the anatomopathological reports were complete and furnished the comparative incidence of the location of the growth. It was situated at the duodenojejunal junction in 3 cases, in the jejunum in 11 cases, the ileum in 16 cases, and in 6 cases at the ileocecal junction.

Practically all authorities, with the exception of Libman, state that it rarely ever develops in the duodenum. Libman found among 42 cases the duodenum affected as often as the ileum. Perry and Shaw found only 9 cases of duodenal sarcoma recorded in Guy's Hospital reports in sixty-eight years.

The following case is of interest because of some diagnostic features, the probable development of the growth upon cicatricial tissue following a previous attack of typhoid

fever and the occurrence of intussusception, a complication noted in several of the reported cases in which the growth was small:

Mr. M., a well-nourished young man, aged twenty-two years, was seized while at work with severe pain in the right lower quadrant of the abdomen. In a short time all of the symptoms characteristic of acute appendicitis developed. His family physician made a tentative diagnosis, advised rest, the application of ice-bags, restricted diet, and gave an enema that caused a copious bowel evacuation. He was very much relieved for six hours, then all the pains returned and his temperature rose to 100.2°. He was suffering intensely when I saw him at midnight of the same day. The abdominal muscles were rigid, there was beginning distention, and a distinct mass could be outlined in the ileocecal region.

He was removed at once to the hospital and his abdomen opened. A quantity of amber-colored fluid flowed from the incision. When the cecum was exposed it was found to be thickened, congested, and somewhat fixed, and contained a mass which was first thought to be a fecal collection. The appendix was unusually long, edematous, and dilated at the end. After some difficulty the cecum was delivered through the wound and the condition was found to be an invagination of a portion of the ileum through the ileocecal valve.

The telescoped portion was easily reduced and measured about 15 inches. Inspection revealed a contracted area completely surrounding the intestine 15 inches from the ileocecal valve, which was evidently of long duration. The peritoneum over the area of stenosis seemed shrivelled and fused with the muscular layer, and it was impossible to pass the tip of the little finger through the lumen of the bowel. Resection was performed and the lumen restored by a lateral anastomosis.

The abdomen was closed after drainage had been provided for through a stab wound incision above the pubes.

His convalescence for twelve days was uneventful. He then complained of a pain in the wound, which finally opened at the lower end and discharged a bloody serum and was followed by a rise of temperature for four or five days. On the twentieth day after the operation he was taken violently ill, rapidly developed symptoms of severe shock and passed a large quantity of blood by the bowel. He was promptly removed to the operating room, where he died while preparations were being made to reopen the abdomen.

The incision was reopened and the hemorrhage found to have occurred from a slough in the mucous membrane of the cecum near the valve, probably due to a thrombus. The site of the anastomosis appeared normal.

The gross specimen presented the typical appearance of cicatricial tissue. The lumen was contracted until it would admit nothing larger than an ordinary lead pencil. The mesentery was also contracted for about 2 cm. distant from the intestine.

While the specimen was being examined his physician stated that he had treated the patient during a severe attack of typhoid fever, which was attended with intestinal hemorrhages several years previous to the present illness, and suggested that the lesion was probably due to contraction following ulceration of Peyer's patches. When the specimen was laid open and the interior exposed, there was found a button-like mass somewhat larger than a twenty-five-cent piece, situated in the centre of the cicatricial area. The growth is well shown in the accompanying illustration, with the exception that it was not so thick as it appears in the drawing.

The following report upon the specimen was submitted by Dr. W. H. Harris, pathologist to the Presbyterian Hospital:

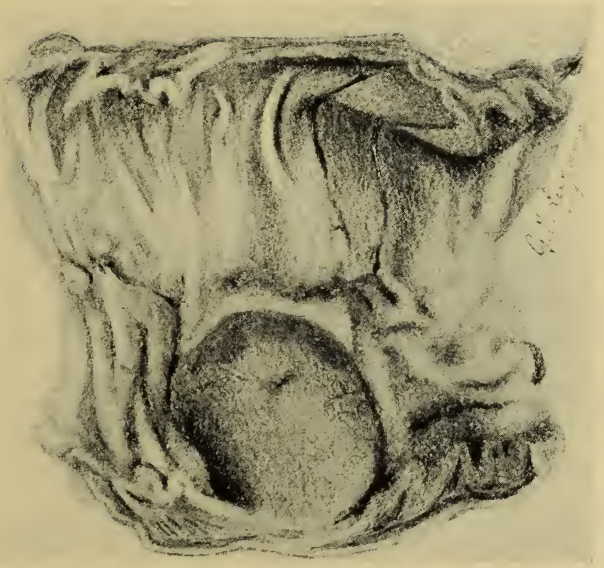
Mr. M., February, 1912. Pathological description. Gross-segment from small intestine 10 cm. in length. It presents on its external surface, just to one side of the

mesenteric attachment, an umbilicated puckered area completely surrounded by an elevated ridge. This ridge forms a symmetrical circle and measures 2.5 x 2.5 cm. In the centre of the depression is a small mass, which has broken through the serosa from within and forms an irregular protrusion on the outer surface. The caliber of the gut is considerably narrowed by this hard refracting mass. The lumen of the gut is so narrowed that only a small swab 5 mm. in caliber could be passed through, and even this, as shown upon opening the gut, has torn the surface. Upon laying open the intestine, its internal surface presents a distinct button-like nodule corresponding in location to the area described on its external surface. It is distinctly round in shape, of a red color and has a smooth unbroken surface. It measures 2.3 x 2.3 cm. by 6 mm. in thickness. A section transversely through the tumor shows the mass to be well limited by the intestinal coats, except near its centre where it projects well toward the outer surface. Its edges adjacent to the gut wall are clearly shown and are slightly irregular in their contour.

Microscopic. Tumor is composed of irregular clusters of small black cells contained in a rather delicate stroma of connective tissue. The cells measure about 8 x 10μ in size and stain a deep blue with eosin hematoxylin. The nuclei are relatively large and occupy the greater part of the cells. Evidences of mitosis are seen scattered throughout. A vestige of the muscular coat of the intestine is present; it is very irregular in outline and shows degeneration. At one point the continuity of this coat is broken and the tumor cells have extended through and spread over its surface externally. Germinal centres and other evidences of lymphoid follicles, or Peyer's patches, are not seen.

Diagnosis. Sarcoma of the small round-cell type or lymphosarcoma.

A search through the list of reported cases revealed only



a few similar instances in which sudden acute symptoms gave the first warning of intestinal trouble. I found only three such cases in Moynihan's list. In the other 37 cases symptoms of transitory abdominal pain, occasional vomiting attacks and nausea, preceded the recognition of the growth from a few weeks to over three years.

If there could be a cardinal symptom it would be the presence of a tumor. It was present in over 90 per cent. of the cases when brought for examination or operation.

It is always present in children and nearly as constant in adults. More than half the cases were reported in patients over forty years of age. Cachexia is only marked in children, except in the late stages.

Fever was often present, as would be expected from the large percentage in which ulceration occurs.

Constipation is not a reliable symptom though often present. Diarrhea was noted in a few.

Three cases have been reported as occurring in the ileum years after severe attacks of typhoid fever, and Nothnagel reported an instance of sarcoma that developed from tuberculous ulcerative scars.

From the case histories on record one must infer that few were correctly diagnosticated prior to operation. Anderson is responsible for the statement that he could find no record of a case in which the diagnosis could be made.

Libman, who has made an excellent study of the subject, has suggested the following classification of the cases:

1. Latent cases in which the tumor is found at autopsy.
2. Cases in which the first symptoms are brought about by intestinal occlusion or perforation.
3. Those in which a similarity to peritoneal tuberculosis is demonstrable.
4. Cases in which icterus is the first symptom.
5. Those in which no tumor can be felt.
6. Cases in which a pronounced resemblance to appendicitis is present. (Van Hook.)

I find that no case that developed sudden abdominal symptoms was suspected previous to operation, and that the diagnosis of appendicitis had been made oftener than any other affection.

The cases in which the symptoms developed suddenly were often associated with acute obstruction, and in several instances with intussusception, such as related in the above history. This has been associated as a rule with quite small growths, in one instance no larger than a cherry.

The location of the growth may be of some diagnostic value. The higher in the intestinal tract the situation of the tumor the more pronounced are the symptoms. So far the *x*-ray has not been used sufficiently to prove its true value. In a recent case of lipoma of the small intestine with invagination, the mass was shown by *x*-ray. (Goodall.)

Obstruction of the bowel is a frequent complication, but stenosis of the intestine is rare. Lecéne found only 2 cases out of 89 in which stenosis occurred.

On the other hand, intestinal dilatation is the rule, an especial though not constant attendant phenomenon of lymphosarcoma and due, according to Lecéne, to a progressive infiltration and final destruction of the smooth muscle fibers without defensive reaction of the connnective tissue, in marked contrast to the changes common to carcinoma.

The round-cell type of tumor is recorded in considerably more than 50 per cent. of the cases; spindle-cell sarcoma the next most frequent, with scattering reports of one or two each of fibromyxo-angio, giant-cell and alveosarcoma.

In thirty out of forty-six instances the growth was single, in sixteen multiple. It is curious to note the frequency of adhesions between the bladder and the involved coil of intestine. In 46 cases Lecéne reported adhesions in 12, 7 of which were instances in which the bladder was the involved structure.

The mesenteric glands are involved early in the course of the disease. It is interesting to note that among the

cases in which remote metastases were recorded, the kidney was the organ most frequently involved.

The first fact impressed upon one who reads the collected reports is, that the surgeon sees the cases too late. There is already a palpable tumor in over 90 per cent. of the cases when an operation is proposed, yet if Moynihan's list is carefully studied only 4 or 5 cases failed to present symptoms of abdominal disturbance of some sort, varying in duration from a few weeks to three years, all of which goes to illustrate the surgeon's great responsibility in passing upon the surgical aspects of chronic intestinal disturbances. Libman takes an extremely gloomy view of the surgical results, particularly in cases of lymphosarcoma with metastases, in which even exploration hastens the end. Even with the acknowledgement before us that the diagnosis is seldom made before operation, or until the growth is palpable, the results have not been altogether bad. Hahn reports a case free from recurrence for eight years; Steinthal one for four years, and another for three and one-half years; Mickulicz one for two years; Haggard one over two years; and quite a number are recorded as having passed over a year without recurrence. In the case personally observed, it would appear that but for the complication of hemorrhage, the patient had an excellent chance for a permanent recovery.

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DISCUSSION

Dr. Frank D. Smythe, of Memphis, Tenn.—I desire to report a case somewhat in line with those reported by Dr. Miller. The patient, a child, female, aged four years, upon whom I operated a year ago for a tumor situated in the left of the median line—epigastric region.

The child was emaciated almost to the extent of a skeleton. The physician referring the case stated that the child had within the past three or four months suffered two attacks of pain and swelling in the abdomen with obstruction of the bowels, lasting four or five days. Both attacks were relieved spontaneously. She was greatly reduced in flesh and strength when I saw her; the abdomen was swollen and the bowels obstructed; vomiting and this condition had lasted eleven days.

A tumor could be palpated slightly to the left of the median line—epigastrium. Exploratory incision was advised, hoping that relief might be afforded. The serious condition was explained to the parents and they decided to return home without operation. Several days later, however, the child was brought to the hospital with the request that operation be performed.

The usual incision for stomach operations was made. Tumor was at point designated, also some adhesions in the hepatic region, and along the right side, the ileum running into the

transverse colon, a case of intussusception. The adhesions were many but were easily separated relieving the obstruction.

No abrasions resulted from efforts at delivery—the tumor was in the head of the cecum, near the ileocecal valve, and about the size of a walnut.

Operation consisted in removal of the ascending colon including cecum and appendix, and two inches of the distal ileum. The transverse colon was divided two inches from its starting part, and the large and small bowels were then anastomosed, end to end, with a Murphy button. Patient's condition was very unpromising though prompt recovery followed—immediate convalescence satisfactory.

Pathologist reported lymphosarcoma of cecum.

Dr. I. S. Stone, of Washington, D. C.— I think the doctor has found something unique. I do not know when I have heard a case of this kind reported, the distinguishing characteristic being an ulcer engrafted upon a Peyer's patch, formerly the seat of a possible ulceration in typhoid fever. It lends color to the fact it is possible to have cancer after an ulcer.

I once had a sarcoma of the lower end of the ileum, and adjoining cecum. This case was reported before our local society about nine years ago. The patient, the sister of a physician, had the symptoms of appendicitis. She had a certain amount of pain, very little rise of temperature, and a mass could be felt. For those symptoms an operation was done and excision was made. This case proved to be one of large round-cell sarcoma. The woman is still living, it having been more than nine years since the operation was done.

REPORT OF A CASE OF LARGE CYST OF THE UTERUS

By Dyer F. Talley, M.D.
Birmingham, Alabama

On July 20, 1912, a young married woman was admitted to the infirmary suffering with a large abdominal tumor; the tumor was uniform in its development and was of such size as to fill the abdominal cavity to its full capacity.

There was pressure to the extent of causing dyspnea and albuminuria.

The appearance of the abdomen suggested very strongly the existence of a large ovarian cyst.

She was twenty-eight years old, had been married sixteen months, was never pregnant, and had noticed for eighteen months that her abdomen was gradually getting larger. Her menstrual flow had been regular and about normal until four months ago, when she began to menstruate too often and lose more than the normal amount of blood; for the past three weeks the flow has been continuous and very free, so that she has grown weak from loss of blood.

Case came to operation July 22, 1912. When the abdomen was opened a large tumor presented and when punctured, it was noted that the wall was thicker than that of an ovarian cyst; from 4 to 5 quarts of a clear straw-colored fluid escaped before the tumor could be delivered and then the fundus reached up near the ensiform cartilage. On delivery of this tumor it was found to be the uterus with the cyst situated in its fundus; the ovaries were enlarged, but otherwise normal and stood out well from the uterus.

The uterus was removed without its appendages and about 1 quart more of clear fluid found in the cyst, making in all 5 or 6 quarts of fluid.

Patient recovered and returned to her home in the country on the eighteenth day after operation.

Following is the report of the pathologist on the specimen:

MACROSCOPIC EXAMINATION

The already preserved specimen consists of the uterus minus the appendages, and measures 17 x 18 x 13 cm. The surface is smooth and glistening except on the lower part of the posterior surface, where several tags of adhesions are present.

Projecting from the uppermost surface of the tumor are two small pedunculated nodules measuring 1.5 cm. in diameter; on cross section of one of these nodules it was seen to be composed of a rather loose connective-tissue stroma from the meshes of which could be squeezed a mucus-like fluid.

In the lower part of the tumor is situated the uterine cavity which has a normal triangular shape and measures 5 cm. from the internal os to the fundus and 7 cm. between the two upper angles. The endometrium has a normal appearance.

The wall posterior to the uterine cavity measures 6.5 cm. in thickness, and is composed of bundles of smooth muscle and fibrous-tissue bundles running in various directions; on the cut surface the open mouths of numerous blood-vessels can be seen. Situated in the upper and anterior wall of the uterus is a large multilocular cyst cavity, which at operation contained approximately 6 quarts of clear straw-colored fluid; in the preserved specimen this cavity measures 13 x 10 x 13 cm. There is no communication between it and the uterine cavity, it is traversed by large and

small fibrous trabeculæ which partially divide it into numerous small and large communicating chambers.

The walls are composed of shaggy tissue and in the posterior part of the cavity is a large core of shaggy sponge-like tissue held in place by trabeculæ extending to the cyst walls.

The entire cyst is surrounded by dense tissue composed of bundles of smooth muscle and fibrous-tissue cells. There is no macroscopic evidence of the cavity being lined with a secreting layer of cells.

MICROSCOPIC EXAMINATION

Wall of Uterus. Composed of numerous bundles of smooth muscle fibers running in various directions and separated from each other by connective-tissue bands; in this connective-tissue portion are numerous thin-walled bloodvessels; the proportion between the muscular and fibrous tissue is about three to one.

Endometrium. The endometrium is two or three times as thick as normal; the glands are larger than normal and are lined by a single layer of cuboidal cells, lying on a basement membrane. The stroma of the endometrium is more abundant than the glandular portion and is composed of round and spindle cells packed densely together.

Pedunculated nodule is composed chiefly of short, spindle, smooth, muscle cells containing round and oval nuclei; the nuclei vary slightly in size, but take the nuclear stain with fair uniformity. The spindle cells are separated from one another by a loose fibrillary connective-tissue stroma; the central portion of the nodule is composed principally of a rather homogeneous, eosin-staining material (hyaline). On the edges of this material numerous smooth muscle and connective-tissue cells are seen and seem to be undergoing a definite hyaline transformation; embedded in the above-

mentioned hyaline material are here and there small blood-vessels grouped around which are a few round and spindle-shaped cells, also scattered groups of short spindle cells containing large, oval, palely-staining nuclei are seen.

Sponge-like Tissue Projecting in Cyst Cavity. Composed of an eosin-staining hyaline-like stroma in the meshes of which are numerous bloodvessels and groups of round and spindle-shaped cells; the walls of many of the bloodvessels are thickened on account of hyaline transformation; in many places also are bundles of smooth muscle cells undergoing a hyaline transformation; there are groups of round and spindle cells containing nuclei varying in size, shape, and staining properties; these cells are undoubtedly undergoing a lawless development. In places the same type of lawless-looking cells are grouped around thin-walled blood-vessels.

It appears from a number of interesting cases of this kind, reported in the book published by Drs. Kelly and Cullen on Myomata of the Uterus, that there is a hyaline degeneration of part of the myoma and this hyaline material liquifies and that, as a rule, it results in a clear straw-colored fluid; none of these cysts were lined with endothelium.

We would rarely expect to find large cysts containing clear fluid except secreting cysts, but the cases reported by Kelly and Cullen, and the one I have reported, show that degenerating myomata may produce them.

Following are a number of cases reported mostly from foreign clinics, some of them of special interest, in that the cyst was lined with epithelium and was situated in the muscular part of the uterus:

Purslow, 1904. A uterine cyst. *British Med. Jour.*, London, February 27, vol. i, p. 493.

The patient, aged twenty-four years; married; one child; was admitted to the Queen's Hospital on November 12, 1903, with a swelling of the abdomen reaching up to 2 inches above the umbilicus, and presenting all the physical signs

of ovarian cystoma. The swelling had been first noticed six weeks previously, and both she and the medical man under whose care she had been, thought that it was growing rapidly. Abdominal section was performed. The cyst when exposed had the appearance of an ovarian cyst. It was tapped and a large quantity of thin yellow fluid escaped from two separate loculi. On commencing to remove the cyst, it was seen to be growing from the fundus uteri, spreading out widely into each broad ligament, with extensive adhesions to omentum and intestine. The operation was difficult and prolonged; it was found necessary to amputate the uterus at the level of the internal os. The patient made an excellent recovery.

Candelet, 1868. Kyste interstitiel de l'uterus, ayant simule un kyste ovarique et enleve comme tel, *Bull. de la Soc. Anat. de Paris*, n. s., vol. xv, p. 392.

Woman, aged forty-three years, entered the service of Demarquay with an abdominal tumor, which had appeared two years before. Until then she had been well, menses regular. Diagnosis of ovarian cyst was made. An exploratory puncture evacuated 5 liters of citron-yellow fluid which was perfectly limpid. Ovariotomy attempted. When the abdomen was opened, it was found that the tumor adhered to the uterus and not to the ovary. Removal of the uterus and cyst. Died thirty-six hours later. Examination showed that a cystic pouch had developed in the wall of the uterus. The walls of the cyst were formed by muscle fibers of organic life, some of which showed changes as found during pregnancy. No mucous tissue found anywhere.

Oskar Frankl, 1911. Uteruscyste, *Arch. f. Gynäk.*, Berlin, vol. lxliii, pp. 649 to 658.

States that the literature of cysts surrounded by true epithelium is rare. Cases by Loehlein, Schatz, Ribbert, Amann, Barereisen, Fabricius, Knauer, Lichtenstern, Amus, and Jaschke and a few less important cases may be found.

The case about to be presented differs in several ways from any other reported. Female, aged thirty-nine years; had never been sick; menses in fifteenth year, every four weeks, regular and lasted four to five days. Last menstruation lasted from October 17 to 21. Had given birth to seven normal and spontaneous children, all puerperal periods being non-febrile. Last partus eight years ago. Patient suffered for some time from backaches of varying intensity. Physical examination showed abdomen soft, in left lower quadrant a spherical tumor with flat surface; quite mobile; no edema of lower extremities. In the left lower quadrant of the abdominal cavity was a tumor with smooth surface the size of a child's head.

Operation November 2, 1910, under Schelich's anesthesia; Pfannenstiel's transverse fascia incision. It was found that the tumor was connected with the left uterine horn. Both adnexæ are ligated and typical supravaginal amputation done. Good recovery.

The body of the uterus presents an oblong tumor size of child's head. On opening the uterine wall by a sagittal incision through the fundus, a smooth-walled cavity with pale, smooth surface was found containing a tense, thin-walled cyst, which caudally through a narrow attachment ring adheres to the performed cavity of the uterus fundus, otherwise lies free in this cavity. Between the outer surface of the cyst sac and the inner surface of the preformed uterine cavity are several collections of yellowish, clear fluid. The cyst is filled with a yellowish (rich in albumin) fluid and contains no pseudomucin and form elements.

It should be added that the two tubal ends showed that the left was situated about 8 cm. higher than the right. This made the corpus cavity asymetric, the left tubal angle being higher than the right.

Microscopic examination showed that the inner surface of the external sac as well as the two surfaces of the internal

sac (cyst sac) possesses the same smooth, shiny, pale gray appearance, namely, all three surfaces were covered with epithelium. A high cubic unilamellar epithelium with regular, deep blue-stained nucleus situated near the base. The protoplasma was finely granular. The examination of a small portion of the inner wall of the outer sac in fresh state showed a margin of the finest ciliary hairs covering the surface of the epithelium. Therefore it is an epithelium such as is found in the uterus at the time of interval between menstruation and particularly at the beginning of same. Many smooth muscle fibers were found in the walls of the inner cyst.

The author entered into a detailed discussion of the formation of such cysts and their primitive origin. Believes that he had a cystic tumor in the fundus uteri which developed through the fact that two glands in the base of the uterus became so invaginated as to form a cystic balloon-like gland which invaginated the relaxed one.

Monod, 1906. Kyste de l'uterus, *Bull. et mém. Soc. de Chir. de Paris,* n. s., vol. xxxii, p. 585.

Monod presented before the society a cyst of the uterus developed in the posterior wall of that organ, which had been removed from a woman, aged forty-five years, by subtotal abdominal hysterectomy, and who showed before operation all the signs of a fibroma. The operation was successful and patient made a good recovery.

Examination showed that one part of the uterus possessed a large cavity with thick fibrous walls, another part, a cyst-pocket within the uterine walls, evidently formed by uterine tissue. This pouch contained a serous fluid.

B. Huguenin, 1910. Ueber multiple subperitoneale serose system des Uterus, Virchow's *Arch. f. path. Anat.*, Berlin, vol. cci, pp. 270 to 275.

Presents a specimen which he received from Professor O. Beuttner. Female, aged fifty-two years, suffered from profuse hemorrhages. Diagnosis: Diffuse fibromyoma,

amputatio uteri subtotalis. Anatomical diagnosis: Multiple subserous cysts on a uterus containing several fibromyoma; residue of chronic pelviperitonitis; chronic cystic oöphoritis; endometritis chronica cystica.

States that S. Mercade classifies cysts of the uterus into cysts of the mucosa, musculature, and serosa. He further states that he (Mercade) has never seen cysts of the serosa and had never observed them in the literature. Therefore, the report by Fabricius must have escaped him. The latter writes (Fabricius. Ueber Cysten an der Tube, am Uterus und dessen Umebebung, *Arch. f. Gynäk. and Geburtsh.*, vol. xxx, p. 393): "One preparation was of interest in that a cross section through the uterus involved the tubal lumen; several infiltrates were directly under the serosa and also between the muscle fibers and corresponding to these sites there were found directly under the serosa numerous tubes (Schlauche) lined with cylindrical epithelium, and at another site about the middle or half-way between the serosa and the tubal lumen were found small cysts lined with beautiful cylindrical epithelium, having a mucous content, and alongside of these cysts were also noted several canals with cylindrical epithelium (Zylinder-epithelichlauche).

Fabricius would trace these cysts back to the germinal epithelium from which the epithelial cells had migrated.

Conclusions: On the surface of the uterus, Huguenin found numerous cysts filled with serous matter. They were situated partly directly under the peritoneum, partly entirely within the musculature. They were lined with a unilamellar or multilamellar coat of cells. These cyst-wall cells are probably changed endothelia; it could not be shown whether the cysts originated from evaginated peritoneal endothelium or emenated from closed lymphatic vessel pieces. Chronic inflammatory conditions caused this cyst formation.

Salva Mercade, 1907. Les kystes de l'uterus, *Rev. ed gynec. et de chir. abd.*, Paris, vol. xi, pp. 217 to 256.

Mercade divides the cysts of the uterus into:

1. Mucous or follicular cysts.
2. Hydatid cysts.
3. Embryonic cysts.
4. Cysts called serous.
5. Bloody cysts.

Huguier, in 1847, divided the cysts of the fundus uteri into mucous cysts and serous cysts. He described the latter as tumors encysted beneath the peritoneum or in the thickness of the tissues proper of the uterine fundus, most of them being sessile, or they may float free (independently) of the uterus in the abdominal cavity. Discusses, but cites no cases.

A. W. Thompson, 1861. A large multilocular cyst, developed in the fundus of the uterus, *Boston Med. and Surg. Jour.*, vol. lxiv, pp. 305 to 307.

Unmarried, light mulatto woman, aged thirty-three years; had typhoid fever in 1865, with recurrence; while convalescing she was frightened by a lunatic; followed by excessive uterine hemorrhage, and examination revealed tumor in the abdomen. Became emaciated and tumor enlarged. In June 1868, she was tapped between the pubes and umbilicus; eight ounces of fluid withdrawn; at two other subsequent operations much fluid was withdrawn, and at the last a little blood. Twenty pints of fluid withdrawn by puncture, collapsed and died. On dissection, removal of sixty pints of fluid. The tumor occurred in the cavity of the pelvis and that of the abdomen. It was made up of a collection of cysts varying in size from a walnut to a fetal head. Each cyst contained a pale, amber-colored fluid; a gelatinous substance having the same color; semi-organized masses, probably blood clots. The uterus was about four inches in length, and the tumor rose directly from its fundus. The parietes of the organ, between its cavity and the inner surface of the cyst, are as healthy as in any other part, and about one-half of the proper thickness.

Dr. Jackson (in discussion) remarked that Cruveilheir reported a pretty large fibrous tumor formed in the fundus of the uterus, and the large cyst was supposed to have been developed in the substance of the tumor. Dr. Jackson questioned this view of the case, believing that the cyst and fibrous tumor were more probably independent formations.

M. D. Mann, 1873. Case of cystic tumor of the uterus, *Amer. Jour. Obst.*, vol. vi, pp. 622 to 627.

Mann reports a case of large cystic tumor in a woman, aged twenty-eight years; married two years, but had never been pregnant. Had noticed swelling a year before, slow at first, later more rapid. Diagnosis, ovarian cyst. Operation September 25, 1871. Enucleation of sac, which contained watery fluid. As soon as the enucleation commenced, it became evident that the cyst had developed from the body of the uterus. Examination of the cyst showed it to be monocular, and the walls found, under the microscope, to contain a few bundles of unstriped muscle fibers. The fluid was about one gallon in quantity, and of a dark chocolate color, depositing a thick sediment on standing. This sediment consisted largely of broken-down blood corpuscles. Recovery of patient.

Loebl, 1872. Cystic tumor of unusual character in the wall of the uterus, *Lancet*, London, vol. i, p. 12.

Woman complained of tumor in right side for two years. Showed tumor rather towards the left side larger than a man's head, painless on palpation. Later pains set in, also vomiting. Died. Autopsy showed a tumor not unlike an ovarian cyst, projected in the position of the distended bladder from the pelvis, nearly in the middle line. It was found externally to occupy the front and left walls of the uterus. The mucous membrane of both vagina and uterus was hyperemic and injected, and the right wall of the latter was thickened. The left side and front of the uterus was occupied internally by the tumor, whose size was that made out during life, and whose shape can best be represented

by imagining two slightly oval balls, one half as large as the other, each cut flat at a fifth of its diameter from one end, and the flat surfaces cemented together, the larger ball being uppermost. Section showed that it was made up of a number of compartments not communicating with each other, whose thin walls were formed of a connective tissue, carrying bloodvessels which passed across the tumor. The contents of the cyst was a clear yellow, apparently serous fluid. The tumor was situated completely in the substance of the uterus, the fundus being its upper boundary, while remains of muscular fibers could be detected in its outer wall, close under the peritoneum.

"Rokitansky had never before seen one like it, and it is believed that an account of a similar one does not exist in pathological literature."

Salva Mercade, 1906. Kystes et absces de l'uterus, *Thèse*, Paris, p. 200.

Under serous cysts he reports 8 cases as follows: Thibaut, 1842 (Kyste de l'uterus chez une femme qui portait un polype fibreux. Rupture de kyste avec peritonite mortelle en 3 jours, *Bull. soc. anat. de Paris*, vol. xvii, p. 164) reported a women who suffered from fibrous polyp. Died from peritonitis. At autopsy a large cyst was found on superior border of uterus extending into abdomen. The walls of the uterus were thinned and a light fluid emenated from the perforation. Incision of the uterus revealed the insertion of the polyp.

Case 2. Atlee. Large cyst of the uterus, 1843. This was not an intramural cyst, it merely rose from the surface of the uterus.

Case 3. Pehard, 1847. *Bull. Soc. Anat.*, vol. xxii, p. 11. This was a woman, aged thirty-six years, who had a fibroid cyst in uterus superiorly while the anterior portion on left side showed a large number of small, yellowish hydatiform cysts, all independent, one from the other, and implanted in the tissue of the uterus.

Case 4. Huguier reports a serous cyst from the posterior surface of the uterus. Woman, aged thirty-five years; had child one year ago. Woman died from bilateral pneumonia. At autopsy the tumor was found situated between the uterus and rectum, and its implantation site corresponded to a depression in the wall of the uterus. The adhesion of the cyst to the uterus was quite firm and composed of cellulofibrous tissue. The cyst was composed of three layers; an external peritoneal, a middle fibrous, and an internal serous layer. The cyst contained a serous, colorless, limpid fluid.

Case 5. Huguier. This is a woman, aged sixty-six years, who died from cancer of left breast. Married at twenty-six years, nine months later still-birth of two children. Five years later spontaneous birth of child which lived. At autopsy there was found in the wall of the uterus (posteriorly) a cyst the size of an orange. It is of roseate and opaque appearance except at the upper extremity, where it is almost transparent. The fluid was very clear, yellowish, non-viscid to the touch. The cavity of the uterus lay anteriorly and below the cyst.

Case 6. Candelet, 1868. Kyste interstitiel de l'uterus ayant simule un kyste ovarique et enleve comme tel, *Bull. Soc. anat. de Paris*, vol. xiii, p. 392. Woman, aged forty-three years, had tumor in abdomen for two years. Demarquay made a diagnosis of ovarian cysts. Puncture was followed by withdrawal of 5 liters of lemon-yellow fluid, perfectly limpid. It was found at operation that the tumor came from the uterus and not from the ovary. Died thirty-six hours after removal of tumor. Examination showed that a cystic pouch had developed in the thickness of the wall of the uterus within the muscle fibers. The walls of the cyst were filled with muscle fiber, some of which presented the same changes that one finds present during pregnancy.

Case 7. Pean, *Leçons de clinique chirurgical*, vol. iii, p. 980. Female, aged twenty-seven years. Menstruation

began at fifteen years, always very irregular. Married at eighteen years; no children. Observed tumor for past three years, which seemed to fluctuate in size with the catamenial period. She looks as large as a pregnant woman at term. Puncture of the sac allowed escape of 13 liters of serous fluid. It was found that an interstitial cyst had developed from the posterior wall of the uterus. Does not say whether patient recovered or not.

Case 8. This is a case by Loebl, *Lancet*, London, 1872, vol. i, p. 12.

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DISCUSSION

Dr. Herman J. Boldt, of New York City.—The report of Dr. Talley's case is an unusually interesting one, but I believe Dr. Talley and those who have made a study of cystic

degeneration of myomatous tumors will concede that this is not a cystic degeneration of a myomatous tumor. A myofibroma, in a state of cystic degeneration, presents an entirely different picture. We are well acquainted with that form of degeneration, and there are, as a rule, very small cavities where we have a cystic change taking place in the tumor. The doctor has reported to us a case which I believe was a cystic tumor of the uterus to start with, and it so impressed me after listening to the description of his case as well as when I saw the picture, and that in connection with the history, in all probability, it is a malignant type of tumor, and the reason I am led to believe that is from the rapid growth of the tumor from the time it was first noticed up to the time it came under observation. We all realize the fact, I think, that there is nothing so difficult in gynecological work as to make a correct diagnosis, and upon that depends the entire treatment. I do not know of anyone who is in a position to invariably make a correct diagnosis, and that holds particularly true with tumors that have undergone degeneration, the degenerative form of tumor being in an entirely different condition. We frequently speak of degenerative myomas when, as a rule, that form of tumor is shown to be such at the time of the operation from the start. From a practical point of view in Dr. Talley's case, I will say that under all such circumstances it is essential not only to do a supravaginal hysterectomy, but a panhysterectomy, which was done in Dr. Talley's case I understand, but in this class of patients we should do a complete extirpation of the adnexa as well.

Dr. Thomas S. Cullen, of Baltimore.—Dr. Kelly and I have had quite a number of cases of cystic myoma and Dr. Talley's specimen corresponds closely with some forms of cystic myoma we have had to deal with. As a rule we do not see very large cystic areas. In some cases, however, very large cyst spaces were present. In the majority of cases where there is cystic degeneration there is, as Dr. Talley has pointed out, first hyaline transformation. This hyaline material melts and we then have large or small cysts filled with clear fluid. If you examine the walls of such a cyst you will find it consisting of hyaline material and there is no epithelial lining to the cavity.

We have observed some cystic myomas that were as large as a seven months' pregnancy, and on cutting these open we

found them to contain large and small cyst spaces. On examination of these cysts histologically I found that they were devoid of any epithelial or endothelial lining.

The cystic myomas occasionally reach very large proportions. In "Myomata of the Uterus"[1] I described a 38-pound cystic myoma. On opening the abdomen I thought I was dealing with a multilocular ovarian cyst, but on reaching the pedicle found that I had to deal with a cystic myoma. The greater part of this tumor was made up of large and small cystic spaces. One cystic space was fourteen inches across. On histological examination none of the cysts showed any evidence of endothelial or epithelial lining.

As the cystic spaces increase in size the neighboring cysts may open into one another and the remnants of the old cyst walls may be represented by trabeculæ stretching across the resultant large cyst cavity. From these trabeculæ hemorrhage occasionally occurs.

The largest myoma I have ever removed was one that weighed 89 pounds. It was pedunculated and received nearly all of its blood supply from the omentum. A certain amount of nourishment came from the stomach and in removing the tumor we took away a piece of the liver which was densely adherent to it. In that case the tumor weighed four pounds more than did the patient. It was a cystic myoma and contained a large amount of blood.

There is another variety of cystic myoma namely, the cyst formation occasionally noted with adenomyoma of the uterus.[2] Sometimes the adenomyoma forms a mantle around the uterine cavity. In such a case there is a diffuse thickening of the uterine walls, coarse in texture, and the normal uterine glands penetrate the chinks in the myomatous tissue. The uterine glands end where the diffuse thickening ceases. Sometimes as a result of the unequal development of the myomatous tissue there may be a little depression or bay-like dilatation running off from the uterine cavity. With the continual growth of the myomatous tissue this bay becomes nipped off from the uterine cavity and as it is lined with uterine mucosa the menstrual flow in this bay cannot now escape but keeps on accumulating. Finally it may reach the peritoneal surface of the uterus and

[1] Kelly-Cullen, "Myomata of the Uterus," W. B. Saunders Co., 1909.

[2] Thomas S. Cullen, "Adenomyoma of the Uterus," W. B. Saunders Co., 1908.

we then have a subperitoneal cystic myoma filled with chocolate colored contents—remnants of old menstrual flow.

Dr. Talley (closing).—I have very little to say in closing. I want to thank Dr. Cullen for helping me to find out what this condition was and for working it up. In the report of other cases I have not noticed that there were any menstrual disorders. It seems to me they would occur or we would expect them to occur where we have a myoma. I think the diagnosis from ovarian cyst would depend upon getting an early history of median development instead of development on one side of the abdomen and later on of menstrual disturbances, such as menorrhagia and metrorrhagia, which we would expect to have in the presence of myomatous development.

REPORT OF FIVE CASES OPERATED ON A SECOND TIME FOR EXTRA-UTERINE PREGNANCY

By Stuart McGuire, M.D.
Richmond, Virginia

Case I.—Mrs. B., aged twenty-six years; married three years; no previous pregnancy; menstruation more or less painful and irregular; was admitted to the hospital, February, 1907, with symptoms of tubal pregnancy. Section and removal of a ruptured right tube. Patient recovered and remained well for over four years. She was brought back to the hospital, July, 1911, with ruptured tubal pregnancy of the left side.

Case II.—Mrs. P., aged twenty-eight years; married five years; no children; one miscarriage; menstruation regular but painful; was admitted to the hospital, January, 1908, with ruptured tubal pregnancy of the right side. Operation and removal of tube and ovary. The patient remained well for over two years. In October, 1910, she reëntered the hospital with rupture of the tube of the left side.

Case III.—Mrs. B., aged forty years; married four months; menstruation normal until present illness; was admitted to the hospital, September, 1909, with ruptured tubal pregnancy of the right side. Operation and recovery. Six months later she returned complaining of symptoms similar to those she had previously suffered, and a second operation showed an unruptured tubal pregnancy on the left side.

Case IV.—Mrs. W., aged thirty-five years; married two years; no children or miscarriages; menstruation regular

but painful; was admitted to the hospital, July, 1910, with ruptured tubal pregnancy of the right side. Operation and removal of the tube. Patient remained well for about a year and then returned to the hospital with symptoms pointing to recurrence of her former trouble in the opposite side. Section showed unruptured tubal pegnancy.

CASE V.—Mrs. K., aged thirty-three years; married six months; no previous pregnancy; menstruation regular and painless; was admitted to the hospital, October, 1910. Her abdomen was opened and an unruptured tubal pregnancy of the right side found. Fifteen months later she returned to the hospital with a ruptured tube of the left side.

A review of the dates on which the second operation was performed on these five patients will show that they all occurred within a period of eighteen months. Such an unusual experience has renewed my interest in a disease about which I though the last word had been said.

The question of the necessity of an operation for tubal pregnancy has been settled.

The question of whether to operate immediately or wait for reaction is one about which we have all formed a personal opinion.

The importance, when possible, of preserving the ovary on the affected side in order to safeguard menstruation should disease at a later date require the removal of its fellow, is generally accepted.

The ability of the healthy peritoneum to take care of a large quantity of free blood is universally recognized, and injurious irrigation and useless drainage of the abdominal cavityare rarely employed.

The question which still remains is whether or not the opposite tube should be divided or excised at the time of operation in order to render impossible a repetition of a condition which the pathological tendency of the patient makes more than possible.

The removal of both tubes would not add appreciably to the danger of the operation, would not interfere with the function of menstruation, and would not increase the chance of distressing physical or nervous sequelæ. It would simply render the woman sterile. But is this desirable? To secure a positive immunity have we a right to sacrifice a possible maternity? This involves two questions: (1) What proportion of women operated on for tubal pregnancy have a recurrence in the remaining tube, and what per cent. of women after such operation become normally pregnant and give birth to a living child? and (2) What is the danger of an operation, and what is the value of a baby?

The first question can easily be answered by compiling statistics. The second is almost impossible of solution as there is no basis for comparison.

On going over the records of my private hospital for a period of ten years, I found the histories of 35 cases operated on for ectopic gestation, and I determined to write to each patient and ascertain certain facts and ask for the expression of personal opinions that might help to solve the problem under discussion. The result, however, has proved very unsatisfactory. Many of my case histories were imperfect, some of the patients could not be traced; one never had a husband; one became a widow shortly after operation, etc.

While my information is not complete I know that five out of the thirty-five patients have had recurrence of the disease in the remaining tube because I operated on them a second time myself. I also know that certainly six of the remaining thirty patients have borne one or more children since their operation.

The five patients who have had a recurrence are very positive in their opinion that both tubes should have been removed at the first operation. The six who have since had a baby are equally positive that it would have been a mutilation which would have deprived them of the greatest pleasure and happiness in their lives.

Giving up the attempt to draw any positive conclusions from my own limited experience I turned to literature, only to find that very little has been written on the subject. Dr. Richard R. Smith, of Grand Rapids, Michigan, read a very comprehensive paper before the meeting of the American Gynecological Association in May, 1911, entitled "Repeated Ectopic Pregnancy," in which he reports four personal cases and reviews the statistics to that date. By personal communication he obtained from sixty-three surgeons a report of their experience. Twenty-five had seen no recurrences, fourteen had seen it once, fifteen had seen it twice, three had seen it three times, three had seen it four times, and three had seen it six times or more.

Dr. Smith tabulates 2998 operations for tubal pregancy, in which recurrence followed in 113 cases or 3.8 per cent. He did not believe these figures represented the true frequency of the accident as he thought it was impossible to follow up such cases accurately over a sufficient period of time to get final results.

He was unable to obtain satisfactory data in regard to how often normal pregnancy occurred in women who had been operated on for tubal gestation. In thirty of his own cases which he had been able to trace, three had borne children since the operation, one being pregnant *in utero* at the time of the operation. He states that while most surgeons have seen instances of normal pregnancy occurring after such operations, he did not think the condition resulted as frequently as might be expected. In conclusion he formulates the following rules to guide the surgeon in the course of a primary operation:

1. "If a woman has had no children and is young, or being older, is desirous of having children, we should conserve the opposite tube unless it is hopelessly closed. We do this deliberately with the full knowledge that further pregnancies may not occur and that she may have in spite of the normal appearance of the tube, a further ectopic."

2. "In women who have borne children, we may be governed by her desire to have more and may leave it unless it is absolutely closed."

3. "In women who have had children and have borne as many as they desire, we should unhesitatingly remove the opposite tube and preclude the possibility of further accident whether the tube appears normal or not."

While I agree theoretically with the rules laid down by Dr. Smith, I do not think practically they will prove of much service, as they leave the decision of the question too much to the patient. A woman just before an operation for ruptured ectopic pregnancy is in no condition to understand or settle a complicated proposition. If she decides either for or against the removal of both tubes she will in after-life frequently regret the responsibility of the decision, fearing on the one hand a repetition of her former accident, or indulging on the other in morbid longings for a child whose advent she has made impossible. The operator should settle the question for himself without taking the woman into his confidence, remembering all the time that a surgeon's and a patient's attitude to an operation is often very different and that their estimate of the desirability of a baby is often very far apart.

In deciding the question the surgeon should try to put the patient in the position of a member of his own family and ask himself: What would I want done if this were my wife, or my sister, or my daughter?

DISCUSSION

Dr. Rufus B. Hall, of Cincinnati.—I am obliged to Dr. McGuire for his excellent paper and the way he answered some of the points under consideration. I will speak only on the question of whether we should take the responsibility or should not, and why we should and why we should not. It is a very responsible position for the operator, and he must do

the best he can, yet he may be undecided as to whether he has done the right thing or not. I have had experience in both ways. I have had the experience of being criticized for leaving a patient so that she could have her second ectopic gestation, and criticized because I insisted on removing what to me was a diseased tube. One ought not to leave a diseased tube to have a recurrence. If a patient finds she is sterile and we leave an ovary and she menstruates, she accuses us of having removed a tube, whereas if we left it she could have a child. In women who have not borne children, if they find they are sterile, they may be very anxious to get a baby. On the other hand if a woman was borne several children she does not seem to have the mental depression as the woman does who has not borne children. I operated a few years ago on a woman, and her physician, who was a very competent man, stood by and I said to him that it looked to me that if I had ever seen a normal tube, the tube we left was normal. We removed the ruptured tube and a pint or so of blood clots a few hours after the rupture, at the end of the six weeks' gestation. In ninety days I removed the other tube with a quart of blood in the abdomen. Even taking the tube in hand we cannot say that it will not become the source of another tubal gestation.

Another case I recall four or five years ago. I operated on her for neglected tubal pregnancy. She had been permitted to bleed two or three times before the trouble was recognized. I said to her doctor, "If we leave the tube this woman will have another pregnancy in the tube," and he says, "Oh, for goodness' sake, leave the tube in, no matter what occurs, because the woman would go insane if she found she could not have a baby." The tube was left. The husband was very anxious for his wife to have a baby, and the wife was anxious to have a baby, and to be certain they would wait until the tube was well. They prevented conception for four years, and apparently the woman seemed well. Her pelvic inflammation had disappeared, menstruation was normal and the woman to all appearances was in good health. It was decided to have a baby within two or three months, she became pregnant and every person was happy. She went on about six weeks, and the pregnancy was not in the uterus, but in the tube. She had a second tubal pregnancy, and she nearly lost her life again. I was asked to operate on her and then they were satisfied now she had to have both tubes removed. I mention

these cases to emphasize the difficulty one encounters in connection with them.

Dr. Walter B. Dorsett, of St. Louis.—The experience Dr. McGuire has met with is certainly very unusual. So far as my own experience is concerned, I have had 60 cases of extra-uterine pregnancy, one of which came under my observation not more than three weeks ago. I do not get the cases in which ruptures have not occurred. The cases I have had have always been those in which rupture and hemorrhage have occurred. Therefore, I say his experience is rather unique in this, that he has been able to recognize unruptured tubal pregnancy. The cases I have had, and we are relating our own experiences in this matter, have been along the line of desperate cases where the women were bleeding to death, and the idea was to go in and exercise the principle of surgery, and that is to resort to hemostasis, stop the hemorrhage. Even if I desired to remove the other tube, in these cases it seems impracticable, because they are shut off with blood clots from the general peritoneal cavity, and we have to dig around and spend a good deal of time in enucleating the tube, I would not remove the tube for the purpose of preventing a second extra-uterine pregnancy. As I have said, all of my cases have been those in which rupture has taken place, and the operation has been done, more or less, as a life-saving operation, getting in and getting out quickly. The less surgery in these cases the better.

Dr. Herman J. Boldt, of New York City.—Dr. McGuire has given us a brief but excellent paper, and in his three final sentences he covers the question in a nut-shell. Those who have done a large number of operations for tubal gestation must have come across a number of instances where there have been repeated extra-uterine gestations. I am one of those who have had quite a number of recurrent extra-uterine gestations. I believe with Dr. McGuire that this matter should be left entirely to the surgeon. Take a case of extra-uterine pregnancy where the other Fallopian tube is recognized to be in a condition of catarrhal inflammation, that tube is liable to another faulty implantation of the conception product. Let us take the case of a woman who has perhaps previously not had any children, or the woman who has had only one or two children, it seems to me that our duty in such cases, unless *a priori* she makes it positive that conception shall not

take place again, is to take a conservative view and give the woman an opportunity to have more children. On the other hand, a woman who has had four, five or six children and then has ectopic gestation, if the tube is abnormal, if it is evident to the surgeon that there is an inflammatory process in that tube, then I believe under such circumstances one is justified to take the responsibility upon himself and remove the tube. If, however, the opposite tube is normal, I do not believe we are justified, despite our recognition of the fact that tubal gestation is likely to repeat itself, in removing a normal Fallopian tube.

Dr. Charles H. Mayo, of Rochester, Minn.—Dr. McGuire has stated that conception took place within eighteen months following operation in five cases of recurring tubal pregnancy, and that a number of cases went through a normal pregnancy. I would like to ask if any advice is given the patients in regard to the possibility of future pregnancies. What was the result and the history of the normal pregnancies which were observed by Dr. McGuire?

Dr. J. Wesley Bovée, of Washington, D. C.—This subject brings to our attention the work of men who have been using so-called conservative surgery of the Fallopian tubes, and I would like to ask for information from such gentlemen, how they will reconcile the idea of chopping off pieces of Fallopian tube and saving other pieces which they consider pathological and hope to become normal, so that future pregnancy may occur, with that now mentioned of removing a good Fallopian tube because the abdomen has been opened for pregnancy in the other one. This is food for thought. For myself, Mr. President, I propose to take a very extreme stand in this matter. I would not remove a Fallopian tube because I thought a woman would become pregnant in it, and I would not sterilize a woman after doing Cesarean section because I was afraid she would need another Cesarean section. I think that is a law we ourselves have no right to control. I also think patients do not know today what they want tomorrow, and a woman whom we sterilize today is very apt to want a child next year or later, and this influences them very much in their thoughts. We should be influenced by scientific reasoning. We should leave in a tube unless it is pathological. I do not believe in leaving a pathological tube, so have always been opposed to too much conservative surgery

of the Fallopian tubes, and I do not believe in leaving them in any more after they have been pregnant. If there is a diseased tube on one side and tubal pregnancy on the other, I would remove both tubes without regard for the patient's desires. In this matter of leaving in a tube, I would modify my opinion from what it was. I would use a vaginal drain in the class of cases of catarrhal inflammation of the tubes, and I do not now regard such pathology as sufficient excuse for removing a Fallopian tube.

Dr. I. S. Stone, of Washington, D. C.—I agree with those very heartily who favor all the conservative work that can be done wherever it can be practised. I do not know of anything which is more gratifying to the surgeon than to see cases where conservation of ovaries and tubes has resulted in the birth of one or more children. When we take up a tube and inspect it, it may look apparently normal, and very often we do that, but we find mucus or pus in that tube, as I have often done by squeezing and forcing it out. It may be mucus; sometimes it is pus when it is not expected.

Dr. Bovée and myself are practising what I call real conservatism in the treatment of all classes of tubes.

There is one thing finally I want to say, it is not an original thought with me, that man may have something to do with the various cases of intoxication and other troubles which women have during gestation. There is a possibility that anaphylaxis may explain the conditions which we have found incurable by medication. Ectopic gestation in the remaining tube may result from some misfit in the biological association of the man and woman.

Dr. Warren A. Dennis, of St. Paul.—I can contribute toward the answer to Dr. Bovée's question by reporting briefly a case of repeated ectopic gestation a little different from any of those reported by Dr. McGuire.

Some seven or eight years ago I operated on the wife of a colleague who had ectopic gestation. The distal end of the tube had ruptured and there was a large blood clot, and as the trouble seemed limited to the outer end of the tube, I thought it would be wise to conserve the proximal portion of it. Three months afterward I operated on account of a terrific hemorrhage for ectopic gestation in the remaining portion of the same tube. Within the last year pregnancy has occurred within the uterus, but she miscarried.

Dr. Charles E. Caldwell, of Cincinnati.—May I make one suggestion which is along biological grounds. It has occurred to me for many years that possibly the attempts of interference with conception which many people practise may have something to do with the arrest of the ovum in the tube. It is a matter I spoke to Dr. Williams about several years ago, and I asked him whether in his experience he had any opportunities of judging of this.

Dr. Hall speaks of cases where they tried to prevent conception for a period of three or four years.

Dr. Hall.—They did prevent it.

Dr. Caldwell.—They were using measures which were a distinct insult to the uterus, and possibly the reflex action on part of the nerves may have arrested the ovum that was impregnated in the tube. I do not think the suggestion has been made before but I really think on biological grounds it is worthy of consideration whether or not we are apt to have tubal pregnancy in a woman who practises efforts at the arrest or prevention of pregnancy.

Dr. Henry O. Marcy, of Boston.—I would like to ask Dr. McGuire to tell us if he knows how many of his cases can be traced to gonorrhea.

Dr. Ernst Jonas, of St. Louis.—As a general thing, I believe Dr. McGuire's dictum should be accepted, that it should be left to the surgeon, who after all should be the best judge in a case of this kind. However, we must not forget the motto which Bismarck used in one of his discussions in the German Reichstag, namely, "Si duo habent idem, non est idem."

Dr. Thomas S. Cullen, of Baltimore.—I fully agree with Dr. McGuire in the advisability of leaving the opposite tube if it is normal or nearly normal. I have had one case of repeated tubal pregnancy. A couple of years after I removed one pregnant tube, my colleague, Dr. Hunner, found the opposite side the seat of pregnancy.

Dr. Bovée spoke of plastic operations on the tube. If we examine a section of hydrosalpinx it will usually show perfectly normal mucosa and hence plastic work on such a tube should not be accompanied by any risk of infection. Where the hydrosalpinx is the end stage of a pyosalpinx the condition is a different one. If the tube is early normal it would seem to be wiser to leave it.

With regard to the early diagnosis of extra-uterine pregnancy,

I would like to say that in 3 out of 8 cases operated on within a month the diagnosis was made before any rupture took place. The family physician in many localities is becoming keener in the diagnosis of extra-uterine pregnancy.

I saw a most instructive case with Dr. George Brown Miller in Washington, in February, 1912. The patient had never been pregnant. Six weeks before I saw her she had missed one period and bled a little. Bimanual examination under anesthesia revealed nothing. The uterus was dilated and curetted and a large amount of tissue came away. The scrapings were examined and a diagnosis of carcinoma was given. Dr. Miller was not satisfied with the laboratory findings. On examining the scrapings I found the surface epithelium intact. The glands in their superficial portions were very narrow, while in the depth they gave the typical picture of the hypertrophy usually associated with pregnancy. The stroma cells were swollen and looked like decidual cells. Both Dr. Miller and I made a provisional diagnosis of unruptured extra-uterine pregnancy, a pregnancy that was so small, however, that it could not be recognized on bimanual examination under anesthesia. At operation on the following day Dr. Miller found an extra-uterine pregnancy not more than 1 cm. in diameter.

Dr. McGuire (closing).—Dr. Mayo misunderstood what I said about the eighteen months period. It was not the interval which occurred between the two operations on the patient but the time during which the operations were done on the five patients.

I have had a fairly extensive experience in surgical work covering a period of over twenty years and I have seen a large number of extra-uterine cases, but I never saw a woman who had been operated on have a recurrence in the remaining tube until about three years ago. Then within a period of eighteen months I had 5 such cases. In one patient the interval between the operation was four years, in another it was only six months.

Dr. Smith, whose paper I quoted, compiled the statistics of 113 cases of repeated extra-uterine pregnancies and found the average interval between the two operations was thirty months.

Dr. Mayo asked me to state the average time that elapsed between an operation and normal pregnancy in cases where women bore children after having one tube removed for extopic

gestation. I am sorry not to be able to answer the question. Although I studied this phase of the subject I was unable to find any satisfactory statistics with reference either to the frequency of normal pregnancy or the average time of its occurrence after an operation.

Dr. Marcy asked me about my observation as to the frequency of gonorrhea in patients the victims of tubal pregnancy. I am sorry not to be able to answer this question. Undoubtedly the disease was a factor in many instances, but I made no effort to get a history of possible infection, as the patients were all seen in private practice and I did not want to run the risk of giving offense or of creating domestic trouble.

In concluding this discussion I wish to state briefly the points I have tried to bring out. For a good many years I operated on cases of extra-uterine pregnancy and never did anything more than remove the affected tube. As far as I know they all remained well until a short time ago. Then within a period of eighteen months five patients I had operated on came back with the same trouble in the remaining tube. This rather unusual experience made me consider the question of the advisability of removing both tubes at the time of the first operation. I have considered it carefully myself and I have brought the question to you. I have decided it for myself and nothing that has been said in this discussion has changed my opinion. It is simply a question between the danger of an operation on the one hand and the desirability of a baby on the other. Personally, unless the opposite tube is markedly diseased or hopelessly destroyed, I propose to leave it. If in my future series of cases I get more recurrences than some surgeons I hope I will also get more babies, and thus, professionally at least, I will do something for posterity.

ABDOMINAL PREGNANCY WITH A LIVING CHILD

By J. Shelton Horsley, M.D.
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The statistics of abdominal, or extra-uterine, pregnancy with a living child has been brought down to 1897, by Howard A. Kelly (*Operative Gynecology*, vol. ii, pp. 458 and 459), and Edward A. Ayres (*Obstetrics*, New York, 1899, i, 70). Kelly's statistics comprise 77 cases with viable fetuses delivered by laparotomy from November, 1809, to November 7, 1896. Ayres brings the table through 1897, and adds 14 cases not included in Kelly's table. This makes 91 cases. From 1897 to January 1, 1912, there have been 12 cases and one in 1897, evidently overlooked, making a total of 104 cases to 1912. In order to make the literature accessible, I will give brief abstracts of these 13 cases.

1. Crouzat and Jeannel (*Rev. Obstetric. Internat.*, 1897, iii, 221). The patient was delivered of a well-formed, male child who lived eleven hours after the operation. The pregnancy had lasted about eight months. The placenta was not removed. The mother died from infection in the placenta one month later.

2. J. B. Sutton (*Obstet. Trans.*, London, 1899, xl, 308). The patient went to full term and on operation the child was found alive, having escaped from the amnion, and was disporting among the intestines. The placenta was removed without difficulty. The child died from convulsions soon after delivery. The mother recovered.

3. H. Tuholske (Trans. South. Surg. and Gyn. Assoc., 1901, xiv, 38). The child was well-developed and living when report was made. Placenta attached to liver and was not removed. Mother died thirty-two hours after delivery.

4. W. L. Estes (*Pennsyl. Med. Jour.*, 1903, vi, 393). The pregnancy was at full term. The child was delivered living and was healthy at the time the report was made. The placenta could not be removed on account of hemorrhage. A marsupial operation was done. The mother died from infection thirteen days after the operation.

5. H. W. Freund (*Samml. klin. Vortrag.*, Leipzig, 1903 to 1907, No. 448, p. 225). A full-term pregnancy. The child died six hours after delivery. The placenta was not removed on account of hemorrhage. The mother recovered.

6. Fournier (*Bull. Soc. d'Obstetr.*, Paris, 1905, viii, 6). The pregnancy had lasted about seven months. A well-formed child was delivered and lived half an hour. The placenta was removed after considerable hemorrhage. The mother recovered.

7. A. Sittner (*Deutsch. Med. Wochenschr.*, 1906, xxxii, 1200). A full term pregnancy. The child was living when the report was made. The mother recovered.

8. E. T. Hargrave (*Virginia Med. Semi-Month.*, 1907, xi, 317). A full term pregnancy. The placenta was removed. The child lived one hour. The mother recovered.

9. Duff G. Lewis (*Wash. Med. Annals*, 1907, vi, 315). An eight and one-half months' pregnancy. The placenta was not removed. A deformed child was delivered and lived three days. The mother recovered.

10. J. A. Allwood (*British Med. Jour.*, 1907, i, 376). An eight months' pregnancy. The placenta was removed. The child lived three hours. The mother recovered.

11. Weiss (*Zentrlbl. f. Gynäk.*, Leipzig, 1908, xxxii, 251). A full term pregnancy. The placenta was removed. The mother and child both recovered.

12. Geo. V. Lockett (*West. Canadian Med. Jour.*, 1908, ii, 476). A full term pregnancy. The placenta was removed. The child was normal and living twenty months after delivery. The mother recovered.

13. John W. Lake (*Boston Med. and Surg. Jour.*, clxiv, 683). A full term pregnancy. The child lived twenty-four hours. The mother recovered.

Of the total number of 104 cases, there were 49 maternal deaths. A large proportion of this mortality occurred before the antiseptic era. In Kelly's table only two of the first twenty mothers were saved. In the thirteen cases collected from 1897 to 1912, there were three maternal deaths. The recovery of the child, however, has not been materially affected by aseptic surgery. The mortality of the child has been a relative thing, because this list only includes children that were delivered living. The vast majority of them lived only a few hours, or at most, a few days. Some of them were deformed. A few, however, survived. Probably a successful case can be gauged by the recovery of the mother and by the fact that a healthy child was delivered and was alive and well twelve months after the operation. From the cases where there are sufficient data given, we can select five that correspond to the requirements of saving the mother and the child living at least twelve months. There are undoubtedly several others that should be added to this list, but when reports are published giving details of such cases, it is merely stated that the child is alive at the time the article was written. It is not entirely accurate to include such cases, for the article may have been written some time before publication.

I wish to add a case of my own to the list of abdominal pregnancies with a living child, which makes a total of 105 cases on record. In this instance both the mother and child recovered, and the child was living and well on December 17, 1912, more than a year after the operation. The history of the case is as follows:

H. L., colored, aged twenty-seven years, from Brunswick County, Virginia, was referred by Dr. B. W. Dameron. Family history of no importance. The patient had been married ten years and had menstruated regularly except when pregnant. The first pregnancy resulted in a miscarriage at four months, about nine years ago. The next child was born dead at full term a year before admission to the hospital. The first menstruation missed was in March, 1911. There was some slight bleeding in April and May, but since that time there had been no sign of menstruation. There were no pains in the abdomen until the onset of labor, and the patient had no reason to believe that the pregnancy was abnormal until labor began. On December 1 she had cramp-like pains around the navel which were very severe. There was no pain in the back. The feet were slightly swollen. These pains continued and Dr. Dameron was called in. He found the uterus empty, diagnosticated abdominal pregnancy, and brought her to the hospital. She was admitted to Memorial Hospital on December 13, 1911, and referred to the obstetricians of the hospital, Doctors D. J. Coleman and M. L. Anderson, who confirmed Dr. Dameron's diagnosis and referred the patient to me for operation. When I saw her on the evening of December 13 she was much exhausted by pains, with legs swollen and pulse 140. She was apparently at full term. A special clinic of senior students was called and operation performed at 10 o'clock at night on December 13, 1911.

A long incision was made a little to the left of the middle line. The intestines and omentum tended to protrude. The anesthetic was given lightly, as the patient's condition was considered dangerous, and she was not thoroughly relaxed. After packing away the intestines and omentum, the baby was found lying largely to the left of the middle line and floating among the intestines, covered only by a thin membrane which also surrounded the placenta. In order to save the child the delivery was accomplished as rapidly as

possible. The head was toward the pelvis and was lifted up with the hand, at the same time rupturing the membrane. The cord was clamped and the child was given to Dr. M. L. Anderson for resuscitation. The baby was a boy weighing six pounds and had no deformity. There were a few adhesions of the intestines and omentum to the sac; these were separated and ligated where they were vascular. The placenta and the sac had a distinct pedicle from the left broad ligament. The pedicle was ligated and the placenta and membranes were removed. The condition resembled very much an ovarian tumor, in which the child and placenta might be said to constitute the contents of the tumor. The wound was closed in layers with catgut and as there was some muddy fluid present, a drainage tube was placed in the cul-de-sac through a stab wound in the right flank.

The patient was returned to bed with a pulse of 150. She was given saline subcutaneously, and one or two doses of strychnine and spartein. Her pulse gradually improved and she soon entered upon convalescence, with a temperature around 100°, and pulse from 95 to 105. On December 24, nine days after operation, she began to have more elevation of temperature with pain in the right side, directly over the point where the drainage had been placed at the time of operation. There was a mass and local rigidity. Blood-count showed moderate leukocytosis. She was given hot douches. These symptoms continuing and vaginal examination showing a mass in the cul-de-sac, a posterior vaginal section was done on January 2, 1912. No pus was discovered but there was free oozing of blood and serum. A rubber tube was fastened in the opening. From this time on her convalescence was satisfactory. There was a slight stitch infection of the abdominal wall, which healed readily. Mother and child were in excellent condition when discharged from the hospital on January 22, 1912, and both are well now, December 17, 1912, more than a year after the operation.

EXPERIMENTAL DEVASCULARIZATION OF INTESTINE WITH AND WITHOUT MECHANICAL OBSTRUCTION

By J. Shelton Horsley, M.D.
and
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Experimental work on intestinal obstruction has been quite abundant in recent years, yet the subject is at present by no means settled. Much, however, has been learned. The work of Stone, Bernheim, and Whipple (*Johns Hopkins Hospital Bulletin*, June, 1912) shows that the theory holding death from obstruction to be due to a toxic product formed in the mucosa is correct. By a series of brilliant experiments they have isolated the toxic principle from the mucosa of the obstructed intestinal loop. They have freed it from germs by the centrifuge and compared it with preparations from the mucosa of a normal intestine. They have checked up their experiments by controls which have been so frequently lacking in other work of this character and have demonstrated that this toxic product is constant in an obstructed loop of bowel when ileus occurs; that it is not due to germs; that it is not found in the mucosa of unobstructed bowel; that it decreases in quantity or virulence from the duodenum to the ileum; that the injection of this material into an animal will cause symptoms of ileus; and finally, that animals may be rendered partly immune to obstruction by injection of graduated doses.

Just why this toxic product forms in an obstructed loop has not been ascertained. The action of bacteria and the

interference with circulation do not seem to have a consistent relation in causing it. It has long been known that the lumen of the bowel itself might be occluded without producing symptoms of ileus, provided the obstruction was low down in the intestine and the animal was not fed or purged. Hartwell and Hoguet (*Jour. Amer. Med. Assoc.*, July 13, 1912) have noted that obstructions high up are not so rapidly fatal if the animal is given salt solution underneath the skin and infer that the early death of a high obstruction is due chiefly to the marked loss of water in vomiting. This does not entirely agree with the work of Stone and his colleagues who find that the toxic principle is more potent in the duodenum than when a loop of bowel is obstructed farther down.

Our experiments were originally undertaken for the purpose of demonstrating, if possible, the difference in the effect on an animal when the devascularized segments of intestine were obstructed at both ends and when such segments were open and their products allowed to flow freely into normal bowel; but the fate of the obstructed loop eventually became the chief subject of investigation. In all experiments the last portion of the ileum was used. All the animals were dogs, and in each instance they were operated upon under full ether anesthesia and every precaution taken to prevent pain. There were twelve experiments. Two recent experiments, together with ten that have been previously reported (*Jour. Amer. Med. Assoc.*, August 24, 1912), may be summarized as follows:

In each experiment a segment of bowel in the lower ileum was devascularized by cutting the mesentery close to the border of the intestine and ligating the bloodvessels. In five of these experiments tapes were tied at each end of the devascularized segment to obstruct, but not injure, the bowel, and so shut off its lumen from the healthy intestine. In all except the first dog (No. 1) the omentum was wrapped around the intestine. Of the five operations in which tapes

Fig. 1.—Four inches of intestine were devascularized and omentum wrapped around the segment. Dog was never very sick. Killed fifteen days after operation. Very few adhesions except of the omentum to the devascularized segment. Nutrition of the intestine was apparently normal.

Fig. 2.—Five inches of intestine were devascularized and omentum wrapped around the segment. Dog died after twenty-eight days from causes not connected with the operation. The omentum was adherent around the segment. The segment which shows on the right has been partly dissected free from the omentum. Note the blood-vessels from the omentum, which enter the bowel on its convex surface. The segment is apparently well nourished.

were placed on the devascularized segment, two dogs died within forty-eight hours after the operation from gangrene and perforation of the obstructed segment with peritonitis. One died after three days, and two others lived thirteen and fourteen days respectively. Of the seven dogs in which the mesentery was separated and the devascularized segment left unobstructed, one died twenty-seven days after the operation from mechanical obstruction from adhesions, another died twenty-eight days after operation from causes not attributable to the operation, and the other five were killed under anesthesia at periods varying from fifteen to forty-nine days and were apparently healthy at the time of their death. The dog allowed to live longest (No. 12) was in excellent condition when killed, forty-nine days after operation. The specimen showed the bowel well nourished, unobstructed, and apparently normal.

These experiments seem to show that the toxic product is either not formed to any marked degree when a loop of the ileum is completely devascularized, or else if it is formed the normal mucous membrane does not absorb it. Stone states that it is of low potency in the ileum. According to the experiments of Murphy and Vincent (*Boston Med. and Surg. Jour.*, November 2, 1911), venous obstruction always adds to the gravity of the situation. We have not attempted anything along this line, but in the seven dogs in which the loop of intestine was completely devascularized without obstruction of the lumen there was no death that could be attributed directly to the devascularized loop and only two deaths occurred at all: one twenty-seven days after the operation, and the other twenty-eight days after operation. Of five dogs in which the loop was both devascularized and obstructed, death in two was due to rupture of the gangrenous segment and general peritonitis, and of the remaining three, one died after three days without rupture of the segment and the other two lived thirteen and fourteen days respectively. The death that occurred at three days

might possibly have been due to the toxic principle worked out by Stone, but the other two dogs apparently died largely from starvation. Of the seven dogs with devascularized segments without obstruction it is interesting to note that whatever product was formed in these segments did not apparently influence the health of the dogs, although it could flow freely to the normal bowel. The most interesting feature, however, is the fact that the bowel in each instance survived and functionated satisfactorily. The technique merely consisted in completely severing the mesentery close to the bowel, wrapping the omentum around the segment and fastening it with a few stitches.

It has usually been taught that if a bowel is deprived of its nutrition from the mesentery for even a short distance a resection should be done. These experiments demonstrate that in the dog at least a loop of four or five inches of intestine may be deprived of its blood supply through the mesentery and may still survive if the omentum is wrapped around it and fastened in position. In long abdominal operations where for some reason the mesentery has been severed from the bowel and the patient's condition does not admit of a resection, it appears justifiable to wrap the omentum around this portion of the bowel and stitch it to itself and the intestine, with a reasonable expectation that the segment will be properly nourished through the omentum.

SEPARATION OF MESENTERY WITH TAPES ON DEVASCULARIZED INTESTINE

Dog No. 1. Eight inches devascularized. No omentum wrapped around devascularized segment. Dog looked sick twenty-four hours after operation; abdomen distended; respiration rapid. Died after thirty-six hours. Large amount of bloody fluid in abdomen; bowel proximal to tapes greatly distended; omentum adherent to abdominal incision, but

not to intestine; segment of bowel black, jelly-like, with large perforation near proximal tape.

Dog No. 2. Two inches devascularized. Omentum wrapped around segment of bowel and fastened with silk sutures. Dog apparently well for four days; for three days quite sick; then better for three days, when he became worse. Died after fourteen days. No free fluid, but coating of lymph on peritoneum; bowel proximal to tape greatly distended, distal firmly contracted, and surrounded by densely adherent omentum.

Dog No. 4. Two inches devascularized. Operation same as in dog 2. Dog appeared very sick from time of operation. Died after forty-eight hours. Large amount of free bloody fluid, marked distention of proximal bowel, contraction of distal; omentum adherent to abdominal wall but not to bowel; segment black, jelly-like; large perforation.

Dog No. 5. Two inches devascularized. Operation same as in dog 2. Dog did well for three days, then appeared very sick for one day; again seemed better until two days before death. Died after thirteen days. No free fluid; no distention of intestine either above or below tapes; omentum firmly adherent to segment, which showed but little change. Coats of this segment somewhat discolored and swollen, but sharply outlined. Evidently the omentum preserved the nutrition of the devascularized intestine.

Dog No. 8. Two inches devascularized. Operation same as in dog 2. Dog appeared quite sick from time of operation. Died after three days. Small amount free bloody fluid; proximal bowel distended; omentum adherent to segment of bowel, which was dark, reddish, and thickened.

SEPARATION OF MESENTERY WITHOUT TAPES ON DEVASCULARIZED SEGMENT

Dog No. 3. Two inches devascularized. Omentum wrapped around segment and sutured. Dog looked sick

day after operation; recovered and was better until two days before death; no food. Died twenty-seven days after operation. Dog much emaciated; no free fluid in abdomen; segment adherent and in a partial volvulus, causing mechanical obstruction; segment well nourished; intestine above segment dilated and filled with hair for about two inches.

Dog No. 6. Two inches devascularized. Omentum wrapped around segment and sutured. Dog did well; never very sick; no food. Killed twenty-two days after operation. Dog much emaciated; segment very adherent; bowel proximal to segment dilated and contained fecal matter; distal bowel contracted, but contained fecal matter also; segment dilated, very thin, but no perforation.

Dog No. 7. Two inches devascularized. Omentum wrapped around segment and sutured. Dog never appeared sick; no food. Killed twenty-one days after operation. Dog fairly well nourished; segment buried in mass of adherent omentum and mesentery; segment well nourished; no evidence of obstruction.

Dog No. 9. Four and one-half inches devascularized. Omentum wrapped around segment and sutured. Dog never very sick; no food for eight days; then food given freely for ten days. Killed eighteen days after operation. Dog in fair condition; omentum adherent to segment; otherwise there were few adhesions; vessels in adherent omentum much enlarged; nutrition of segment apparently normal; no evidence of obstruction.

Dog No. 10. Four inches devascularized. Omentum wrapped around segment and sutured. Dog never very sick; no food for five days; then food given freely for ten days. Killed fifteen days after operation. Dog in fair condition; omentum adherent to segment; otherwise very few adhesions; vessels in adherent omentum were enlarged; nutrition of segment good; no evidence of obstruction (Fig. 1).

Dog No. 11. Five inches devascularized. Omentum wrapped around intestine and sutured beyond borders of devascularized segment. Food and water given following day and until dog died. Died twenty-eight days after operation. Dog emaciated, weight about same as at operation. Omentum adherent over devascularized segment. No distention or obstruction at any point; vessels of adherent omentum enlarged; cause of death not ascertained. nutrition of segment apparently good (Fig. 2).

Dog No. 12. Four and one-half inches devascularized. Omentum wrapped around intestine and sutured beyond borders of devascularized segment. Food and water given following day and until dog was killed. Recovery uneventful. Killed forty-nine days after operation. Dog in excellent condition; had gained in weight; omentum densely adherent to segment; no obstruction; vessels of adherent omentum enlarged.

DISCUSSION

Dr. Alexius McGlannan, of Baltimore.—If I understood Dr. Horsley correctly, his work was done in the ileum, and the condition of affairs in obstruction of the ileum as compared with the condition of affairs in the duodenum is entirely different. The work of Dr. Stone was done in the duodenum.

A great many years ago Dr. Halsted made a closed loop of the ileum, restoring intestinal continuity around the loop and the dog got along just as well as if nothing had been done to it, so that obstruction in this portion of the intestine does not compare with the work done by Whipple and Stone, and before them by Draper, with regard to the cause of death in obstruction.

In studying the clinical side we went through the experimental work thoroughly, and I am quite familiar with it. Great credit is due to those doing the experimental work on this subject. Just before I left Baltimore Dr. Stone was good enough to detail the results of their last experiments which are now in press. He gave me the liberty of quoting him.

They have established this very important fact; after separating the loop of duodenum before obstructing it, they were able (by the use of fluoride), to destroy the epithelial cells of the duodenum. When this was done, and the loop obstructed as in the other cases, no toxic symptoms developed. This has proved beyond doubt that the cause of the toxemia is the secretions from the epithelial cells of the obstructed duodenal loop. This I think is a very important point in the experimental work on intestinal obstruction.

THE INDICATIONS FOR ABDOMINAL CESAREAN SECTION

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It is not the purpose of this paper to make an exhaustive study of the many indications for abdominal Cesarean section. Such a review, while it might possibly be made interesting and profitable to the obstetrician, would be out of place before this body of general surgeons and gynecologists, whose work as a rule, and from choice, is not along obstetric lines. Therefore, I propose to discuss some of the more important and commoner indications for the operation under consideration, illustrating the various indications by cases from my own practice.

First let me say that it is my belief that the chapter on the indications for abdominal Cesarean section must be rewritten, on account of the great advances made in the technique of the operation. Undoubtedly the results of abdominal Cesarean section will be still more satisfactory, once the surgeon comes to a full realization of the fact that, unlike the intestine, the stomach, or the bladder, the pregnant uterus, when sepsis from below is present or liable to develop, cannot be incised by the abdominal route without grave danger of a fatal issue from peritonitis. It is difficult to keep this difference in mind. Still it must be done if the indications and contra-indications for the operation are to be intelligently studied.

Obstetrics is perhaps one of, if not *the* most conservative departments of medicine and surgery. The obstetrician, among other things, gives up a great deal of time to the

consideration of how the fetus or passenger shall best be conducted through the pelvis or the passage. Sometimes the latter is narrow or otherwise obstructed. Sometimes the fetus in itself or in its position is at fault, and complicates the problem. At other times the difficulty lies with the power of uterine contractions. The obstetrician's art consists in unravelling the tangle and so changing conditions as to make it possible for a live child to be born by the natural passages. And giving up so much time and thought to the problem, he very naturally is somewhat contemptuous of the surgeon who, waiving aside the problem outlined above, settles the question by removing the child through the abdomen. Now I must confess that my sympathies are chiefly with the obstetrician. I am afraid that I am not any more in accord with the surgeon who does an abdominal Cesarean section on the slightest provocation, than I am with the operator who does not attempt to make a diagnosis of an abdominal growth on the plea that such a procedure is useless since he will find out what is the matter after the abdomen is opened. Neither operator is playing the intellectual game fairly, and each is seeking the path of least resistance.

However, while my sympathies may be with the obstetrician, I cannot but think he has been at times ultraconservative, and that the results for both mother and child being obtained by the advocate of the abdominal route should lead him to revise his opinions, and see if at times prejudice has not prevented his adoption of certain procedures. To put it another way, the only right the obstetrician has to demand that the child be born through the natural passages, is through his ability to show that by so doing, a better mortality and morbidity for mother and child will result. When through ultraconservatism or a desire to maintain a position at all hazards, the obstetrician's statistics in any class of cases compare unfavorably with those advocating more radical methods, the accoucheur is fighting a

losing game. And the sooner he realizes this, the better will it be for his patients and for himself. Perhaps an illustration will help to make my meaning clear. For generations past medical students have been taught when and how to apply high forceps. Teachers and pupils have become expert operators and in many instances have saved the children with no injury to the mothers. However, if it were to be shown that in a given series of cases with heads at the superior strait better maternal and fetal results follow abdominal Cesarean section, there should be nothing to hold the obstetrician to the subpubic route. Just because in the old days the results with high forceps were superior to intra-abdominal methods, it does not naturally follow that the same holds true today. All of which goes to prove that obstetricians, as well as other people, while holding fast to old and tried methods, must be open to conviction and be broad enough to accept the new if that be shown superior.

The classification of Routh seems most suitable for a consideration of the indications for abdominal Cesarean section. I shall take the liberty of only including the more common indications, conditions one is liable to meet with in the ordinary course of hospital or private obstetrical practice.

A. Obstruction to labor.
    1. Pelvic contractions.
    2. Fibromyomata.
    3. Ovarian tumors.
    4. Stenosis of cervix and vagina.
    5. Miscellaneous.
        (*a*) Previous ventrofixations.
        (*b*) Large size of child.

B. Uterine hemorrhages.
    1. Concealed accidental hemorrhage.
    2. Placenta previa.

C. Constitutional crises.
    Eclampsia.

A. Obstruction to Labor. 1. *Contracted Pelvis.* Probably more Cesarean sections will be performed for this indication than for any other. A few years ago a comparatively rare operation, performed only as a last resort under unfavorable conditions and with correspondingly bad results, abdominal Cesarean section has now become an elective operation. It is now undertaken with full confidence that in clean cases the most satisfactory results will follow.

The operation is imperatively demanded in cases where the conjugate vera measures 7.5 cm. or less, and the child living. When the child is dead and the true conjugate 6.2 cm. or under, Cesarean section is still indicated, on account of the danger to the mother of attempts to deliver the craniotomized child through such a small pelvic diameter.

It must be borne in mind that there is much uncertainty as regards pelvic measurements. Until the patient with a medium contraction of the pelvis, say with a conjugate vera of from 8 to 9.5 cm., has had a test of labor, it is impossible to say whether she will be able to have a child through the natural passages or not. Therefore, a primipara with a pelvis within these measurements should be given a test of labor. If after a suitable trial, the head is still above the superior strait with no progress, Cesarean section is indicated or the advisability of pubiotomy should be considered.

The following case will serve as an illustration:

Case I.—Miss L. M., aged twenty years, primipara. Pelvic measurements were interspinous, 20; intercristal, 21.5; bisischial, 9; true conjugate, 8. Diagnosis, generally contracted pelvis. Patient was in labor for twenty-four hours with no engagement of the head. Abdominal Cesarean section January 20, 1909. Mother made a good recovery. Child lived twenty-four hours and died from enlarged thymus.

Looked at from another standpoint, the criticism might be made that the case was treated too conservatively and that the conclusion could have been reached even before

labor, that a natural birth with such measurements was impossible. But just here enters the element of doubt, because the patient was a primipara, and an unknown quantity so far as her ability to drive a child of a certain size through this particular pelvis. As long as the patient was not subjected to repeated vaginal examinations and attempts at delivery from below, if the membranes were unruptured and she were not exhausted by long-continued labor pains, her chances with an abdominal Cesarean section were not diminished.

On the other hand, had the case been neglected, had the patient been repeatedly examined and many attempts made to deliver from below, abdominal Cesarean section would have been strictly contra-indicated. Under these circumstances it would have been far better obstetrics, in my opinion, to perform a craniotomy. For a Cesarean section under such circumstances would have meant almost sure sepsis and probable death of the mother with very slight hope of saving the child, already jeopardized by attempts at delivery from below.

The case is different with multiparæ who have had a number of tests of labor and have lost their children from forceps or attempts at version or from other obstetrical operations from below. Under these circumstances it is wise to raise the limit of the extent of pelvic contraction where an elective Cesarean section is advisable.

The following is a case in point:

Case II.—Mrs. L. M., aged thirty-five years, IX-para. First child born at seventh month, next two children at full term and lived. Instruments used on last five children, one of whom died. Pelvimetry-interspinous, 20; intercristal, 24; external conjugate, 18; true conjugate, 9. Diagnosis, generally contracted, flat pelvis. Abdominal Cesarean section March 17, 1907, at the onset of labor pains. Mother and child made good recoveries.

This patient was so well pleased with the results of the

operation that she reëntered the hospital thirteen months later for another Cesarean section, which was performed for the same conditions. Again mother and child made good recoveries. At this time, however, at the request of the patient and her husband, the tubes were cut and buried beneath the peritoneum in order to sterilize the patient.

2. *Uterine Fibromyomata as Indications for Abdominal Cesarean Section.* Luckily, women with uterine fibroids either do not conceive or else they abort within the first three months of gestation. The reason for the early termination of the pregnancy is very apparent if one studies the ovum where the pregnancy was accidentally discovered after hysterectomy or where the uterus was removed without reference to the pregnancy. During the past five years I have been able to turn over four specimens of uterine fibromyomata, complicated by early gestations of from two to three and one-half months to my colleague, Dr. G. Carl Huber, Professor of Embryology. It is very important to the success of Dr. Huber's embryological studies that there be no pathological changes in the material examined. For this reason, embryos obtained from abortion cases are rather unsatisfactory, for necessarily abortion is a departure from the normal. Hence it was hoped that in these four cases mentioned, perfectly normal embryos could be studied *in situ*, yet in each instance the embryo was imperfect from degenerative changes due to hemorrhages about the ovum.

If the embryo escapes these changes and pregnancy continues, the treatment will depend upon the situation of the fibroid growth in the uterus and its relation to the pelvis. Also it must be borne in mind that a fibromyomatous uterus may be a handicapped organ and that its contractile powers may be interfered with to such an extent as to permit of serious and at times fatal postpartum hemorrhage. Rarely is the uterus the seat of a single tumor, hence myomectomy after the removal of the fetus by abdominal Cesarean section will be rarely called for. Fibroid tumors

obstructing labor will almost always be cervical or intraligamentous growths. Other varieties will be lifted up out of the pelvis by the developing pregnant uterus and will not as a rule obstruct labor. From the standpoint of safety to the mother, it would seem best to do a Porro rather than the classical operation where the pregnancy or labor is complicated by uterine fibroids. However, in the case of a first pregnancy, the mother should have the right to decide in favor of the retention of the uterus, so that future pregnancies be possible.

The following is an example of a Porro Cesarean section performed at full term for fibroid complicating pregnancy.

Case III.—Mrs. A. F., multipara, aged forty-one years. Normal pelvis. The last three confinements were terminated by forceps extractions. The patient nearly died from a postpartum hemorrhage, presumably caused by a large fibroid growth in the right uterine wall.

Porro Cesarean section August 6, 1911. Mother and child made good recoveries.

3. *Ovarian Tumor Complicating Pregnancy as an Indication for Cesarean Section.* Ovariotomy during pregnancy is a perfectly safe and reliable operation, giving a mortality of 3.3 per cent. with labor induced in only about 16 per cent. of the cases. With normal pelvic measurements and no reasons for thinking the patient should not have a normal confinement, Cesarean section would not be indicated even if the ovarian growth were removed during labor. The indications for Cesarean section would be a cyst so situated that it could not be removed without first reducing the size of the uterus. Every experienced abdominal operator can easily recall ovarian growths, situated within the folds of the broad ligament, where eradication would have been exceedingly difficult or even impossible in the presence of a full-term pregnant uterus.

Another indication for Cesarean section set forth by Routh seems to me of value, namely, unusual rigidity or undilata-

bility of the soft parts, as might occur in elderly primiparæ. In such patients a long tedious labor might place too great a strain upon the recent abdominal wound with perhaps serious results.

4. *Stenosis of the Cervix or Vagina.* By stenosis of the cervix in this connection is not meant a rigid cervix which fails to yield to labor pains, but a cervix which is the seat of extensive scar tissue, usually dating from a previous confinement. This cicatricial cervical tissue is usually associated with extensive scar tissue in the vagina, so that the passage of the fetus through the narrowed lower part of the birth canal would either be impossible or fraught with grave danger. Attempts at artificial dilatation of such scar tissue is also dangerous because of the difficulty of limiting the direction and extent of the stretching making Cesarean section a much less dangerous procedure.

Attempts at delivery of a large child through a contracted outlet not infrequently result in extensive tears of cervix and vagina, vesicovaginal fistula and complete rupture of the perineum. Repair of these injuries often requires extensive plastic operations, where tissue must be borrowed from one part to repair another. While usually the defects can be remedied, the repaired vaginal canal is usually a mass of scar tissue. A second labor, even under skilful handling, will mean a second series of tears, ruptures, and fistulæ. Under such conditions an abdominal Cesarean section is indicated and should be performed at full term as an elective operation.

The following is a case of this kind:

Case IV.—Mrs. T. D., aged twenty-nine years, entered the University Hospital, September 10, 1907. She had had three children, only the first of whom lived, the others having been stillborn. Last two labors were each over thirty hours in duration, and one child weighed fifteen pounds. Since the birth of the last child, three months ago, the patient has been unable to control her urine or feces.

Plastic operations upon bladder and rectum closed the vesico-vaginal fistula and complete rupture of perineum. So much scar tissue was left in the vagina that the patient was advised in case of subsequent pregnancy to enter the hospital for an elective Cesarean section.

5. *Miscellaneous Indications.* 1. *Previous Ventro- and Vaginofixations of the Uterus.* As has been shown from cases studied from the Johns Hopkins Clinic, the majority of patients subject to ventrosuspension of the uterus will pass through subsequent labors without mishap. But the number of cases presenting serious dystocia is so large as to render the operation unjustifiable in the child-bearing woman, when often less dangerous operations will answer just as well. The same will apply with even more force to vaginal fixations, which have been especially disastrous where the women subsequently became pregnant.

Whenever, in a woman pregnant after a ventrofixation, the cervix is carried backward and upward near the promontory of the sacrum, and the uterus enlarges by distending and thinning the posterior uterine wall, an abdominal Cesarean section is a much safer operation than attempts at delivery from below.

Before I recognized the danger of ventrosuspension in subsequent pregnancies, I was obliged to perform two Cesarean sections on women who were previously operated upon in the University Clinic. The two mothers and children made uneventful recoveries.

2. *Large Size of Child.* The attempts to ascertain accurately the size of the child *in utero* have not been particularly successful. Careful palpation of the fetal parts, together with Müller's method of ascertaining the size of the fetal head relative to the inlet, and experience in many cases will throw some light upon the absolute or relative size of the child. Where the diagnosis of a very large child has been made, and this is borne out by the failure of the head to engage after many hours of labor, Cesarean section

is indicated even if the maternal pelvis be normal. This is illustrated by the following case:

Case V.—Mrs. C. W., aged twenty-two years. Patient had had one dead child at term, the labor lasting three days and terminated by forceps. Pelvic measurements normal. The patient was allowed to labor over forty-eight hours, since there were no signs of maternal exhaustion. At the end of this time, since the head was freely movable above the brim, the cervix was dilated and an internal version performed. The buttocks of the child could not be delivered through the pelvic inlet. Abdominal Cesarean section was immediately performed and an eleven-pound child delivered. Mother and child made good recoveries although the former had a slight sepsis, presumably caused by the manipulations from below.

B. Uterine Hemorrhages. 1. *Concealed Accidental Hemorrhage.* In this grave obstetrical accident the child is usually dead, and any treatment will be directed toward saving the life of the mother. Cesarean section is indicated where the hemorrhage is severe and the mother's condition alarming and growing worse, and the cervix so rigid as to require considerable time to secure dilatation enough to empty the uterus from below. Under such conditions probably better results will be obtained from abdominal than from vaginal Cesarean section, unless the operator has had considerable experience with the vaginal route. As in operations for ruptured ectopic pregnancy where the patient is in collapse and the hemorrhage progressing, the paramount necessity is to stop the bleeding quickly and this is best accomplished by the abdominal route. In concealed accidental hemorrhage, fortunately rather a rare condition, the indication is to stop the bleeding and stop it quickly, if the patient's life is to be saved. But whether the abdominal or vaginal route be chosen, the uterus after beingemptied, should be removed. For experience has shown that in the kind of hemorrhage under discussion, the uterus does not

contract as it is accustomed to when emptied, but is more apt to remain in a state of atony, which means death from postpartum hemorrhage. Hysterectomy is also demanded to guard against sepsis which is very liable to develop after severe hemorrhage from the pregnant uterus.

2. *Placenta Prævia.* Abdominal Cesarean section is only exceptionally indicated in placenta prævia. In the majority of cases the cervix is soft enough to yield to dilatation, so that various intra-uterine manipulations can be employed with a view to stopping the hemorrhage. In rare cases, as in old primiparæ, the cervix may be rigid and undilatable. That is, enough dilatation for effective intra-uterine work could only be secured at the expense of time, which would increase the danger for the mother and probably prove fatal to the child. Under such conditions, if the mother has not been infected by manipulations from below, Cesarean section is indicated. The uterus should be removed as the final step in the operation, for the reasons stated when discussing the treatment of concealed hemorrhage, namely, the increased danger from sepsis in the presence of severe hemorrhage.

C. Constitutional Crises. *Eclampsia.* For those who do not believe in the immediate emptying of the uterus as soon as the patient has been seized with eclamptic convulsions, neither abdominal nor vaginal Cesarean section are ever indicated. However, the majority of obstetricians believe that in the presence of eclampsia the uterus should be emptied quickly, and with the least possible trauma. If the cervix is easily dilatable neither vaginal nor abdominal Cesarean section will be indicated. In the presence of a rigid cervix, however, either one or the other route is indicated, rather than the wasting of valuable time over slow cervical dilatation. In the majority of instances, vaginal Cesarean section is the preferable operation, since it is performed from below without entering the peritoneal cavity. Where the pelvis is contracted, abdominal Cesarean section

is indicated, provided the patient has not been infected from below by repeated examinations or unsuccessful attempts at delivery. Under such conditions craniotomy on the living or dead child is the preferable operation.

I am at the present time engaged in tabulating the results of 425 cases of eclampsia treated by abdominal Cesarean section and some very interesting facts are being brought out. Not only has the literature been carefully searched and all recorded cases been collected but many operators all over the world have been kind enough to furnish me with unpublished cases. Thus the statistics represent not the work of a few, but over two hundred operators.

The total maternal mortality, counting patients operated upon before the aseptic era, was 36.9 per cent., while this was reduced to 31.8 per cent., if only the 317 patients operated upon since 1900 are counted. The 50 per cent. mortality, ascribed to abdominal Cesarean section in the treatment of eclampsia, can be explained by errors in the selection of cases, for many eclamptic patients were subjected to the operation who were hopelessly septic. These patients did not die from the eclampsia or the operation itself. Many of them perished because of the poor judgment on the part of the operators. They would have died even if the operations had not been performed for eclampsia.

In 245 cases of eclampsia where there was no sepsis or very little chance of sepsis prior to the abdominal Cesarean section, the maternal mortality was only 24 per cent. It is significant that in 50 cases where operative procedures preceded the Cesarean sections, the maternal mortality was 48 per cent., the difference in mortality being due, not to the eclampsia, but to the sepsis accompanying the eclampsia, a condition which can be avoided once this relation of sepsis to Cesarean section is fully realized by the profession.

The results of abdominal Cesarean section for eclampsia, so far as the fetus is concerned, should be, and as a matter

of fact are, gratifying in the 425 cases. In 217 cases since 1900, where the fetal statistics could be studied, the fetal mortality was only 5.5 per cent. Even this mortality is reduced to 3.7 per cent. in 132 cases where the sections were performed after from one to five eclamptic convulsions.

These statistics are quoted to show that the last word has not been said regarding the place of abdominal Cesarean section in eclampsia. At least the statistics in over 400 cases have shown beyond a doubt that no one is justified in dismissing the treatment of eclampsia by abdominal Cesarean section with a short statement that the mortality is so high as to make it an unjustifiable operation.

DISCUSSION

Dr. W. P. Carr, of Washington, D. C.—I want to say a word or two with reference to Dr. Peterson's paper, and especially with regard to eclampsia and the indication for abdominal Cesarean section. I was glad to hear him speak, in the first place, about the size of the child's head and the size of the child. That is one thing upon which too little importance has been laid.

Not long ago I had a case in which the pelvic measurements were almost normal. This woman had previously a Cesarean section, and after making the pelvic measurements and having Dr. Moran to see her with me and confirm them, we thought the previous operation had been unnecessary and that she could be delivered in the natural way. But when she came in labor, I waited a long time and tried to deliver her with forceps, and found it was absolutely impossible to make the head engage, and I was obliged to do a Cesarean section. She got along nicely, so did the child. The necessity for the operation was due to the large size of the child's head and the firmness of the bones. They would not yield and mould as they ordinarily do. This condition I have encountered in a good many cases, and it is one upon which too little emphasis has been laid. Operating a second time is often not nearly so easy as the first operation, because of dense adhesions. This was a second operation, and the uterus was absolutely fixed and bound to

the abdominal wall all over the front. In separating these adhesions, although it was done carefully, a piece of the uterus pulled out with the adhesions, leaving a deep hole in the uterine muscle. After the delivery of the child I found the hole diminished very materially in size. A couple of stitches or sutures closed it nicely and no trouble resulted from it.

In cases of eclampsia, vaginal Cesarean section is probably better in the larger number of cases; but there are some in which the abdominal operation is indicated. I have in mind one case I recently operated on a fourth time for eclampsia in which no vaginal work could be done on account of the size and fatness of the woman. Everyone who had seen her, Dr. Moran, Dr. Lowe, and Dr. Magruder, agreed it would be impossible to do the vaginal Cesarean operation. I could not see the introitus at all. I could just feel it with my finger, I could just get to the vaginal outlet, and could not begin to do any work inside. I saw this woman first in a violent attack of eclampsia, and it seemed necessary to deliver her immediately. I thought of the vaginal operation and was going to do it, but it was absolutely impossible, and we did abdominal Cesarean section. She made a beautiful recovery, and so did the child. She has three living children, and was all right after the fourth operation, although the fourth child was dead before labor began. Each time the urine was loaded with albumin. After the first operation it cleared up immediately. After the second operation it cleared up more slowly. After the third operation it did not clear up at all; but she really never gave it a chance, as she becomes pregnant again, every time, in a month or six weeks after the operation.

Dr. Henry O. Marcy, of Boston.—I only wish to refer to the point made by Dr. Peterson concerning the difficulties of delivery in fibroid tumors and the reason why Cesarean section should be considered favorable.

Some years since a practitioner, a man with a very large obstetrical experience, called me in consultation to see a patient whom I had seen three years before, when she had a large fibroid tumor which I advised removed. She became pregnant; and went to full term. After a long period of labor the doctor endeavored to deliver her; he turned and pulled away the child, leaving the head in the uterus. I saw the patient in that condition. A good deal of damage was done to the parts, the woman was *in extremis*. I removed the uterus and a tumor

as large as an adult head. She died from septic infection two or three days later.

Abdominal pregnancies are certainly so rare that they ought to be, when they have gone on to a considerable extent, reported. A case which came under my observation some time ago had been in several hospitals one, two or three different periods and no diagnosis was made. However, it was easier to make a diagnosis when I saw her. When she was admitted she was apparently moribund. She was in the eighth month of pregnancy, the child was dead, but really well nourished, and it was entirely free in the abdominal cavity. The woman died three or four days later from septic infection, but it seemed perfectly easy to have removed a living child had the conditions been known earlier.

I think these cases are sufficiently rare to put them on record, and I am very glad to do so.

Dr. J. Wesley Bovée, of Washington, D. C.—I desire to say a few words with regard to the first half of Dr. Horsley's paper, and that is the matter of delivery of a woman with a full-term pregnancy. As to the advisability of it, I wish to say that if these women are seen during the period of gestation they may be tided along until full-term pregnancy has occurred. This case has one point of interest to me, and that is, contrary to the usual procedure, there was not prompt death of the fetus at the time of false labor. This woman went on from December 1 to December 13 with a living child, thirteen days after false labor and was then delivered of a living child. That is quite unusual. It was formerly thought these cases should all be operated on as soon as discovered; that they should not be allowed to go on to full term nor a minute from the time they were discovered to be abdominal pregnancies. I have heard men with such radical opinions as Dr. Joseph Price, for instance, favor such a plan as is recommended, and claimed that the deformities of such fetuses are so common that we should give the life of the fetus no consideration whatever in the conduct of the case. Of course, that is absolutely disproved by the facts, and I hope Dr. Peterson, who gave us a paper on the subject two years ago, will also call attention to some of the facts he had in his paper at that time, showing, I think, it is only about 11 per cent. of these cases have any deformities whatever. So that element should be left out entirely.

With regard to the control of bleeding vessels at the time of the operation of a full-term pregnancy, in the case of a living child the suggestions that were made by Dr. Werder in his paper some four years ago, and the recommendations of Dr. Peterson and myself which were made on it, when I published a series of seventy ectopic cases a few years ago, are to be borne in mind in this connection. I myself have not operated on a full-term abdominal pregnancy where the fetus was alive. In two or three cases I have operated on them beyond the death of the fetus; in one of them nine years beyond the death of the fetus, and this woman had a living child aged three years when I operated on her.

Dr. John C. Wysor, of Clifton Forge, Va.—I wish to report a case of Cesarean section, the indications for which Dr. Peterson did not mention in his paper. The woman, aged thirty-eight years, was pregnant at term for the first time. She had a miscarriage, at four or five months, several years ago. I was called on last November 12, in consultation with a colleague in my town to see this woman, and found that one week before she had lost all of the amniotic fluid without any pain. The doctor examined her at the time, and told her to wait until labor should set in. One week later he was called and found the elbow presenting, with absolutely all the amniotic fluid gone, and after a while he called me, and under anesthesia he undertook to turn the child. The cervix was dilated very imperfectly, and it was impossible for him to introduce his hand in order to deliver the child. We let her alone for some hours. Several hours later we saw her again, and after a vain attempt at turning he asked me to try. After introducing my hand into the vagina, I told him I thought Cesarean section was a more simple way out of the difficulty than to try to turn the child under the circumstances, fearing rupture of uterus. The cervix was tolerably rigid, and with the elbow presenting proper dilatation could not take place; consequently we took her to the C. and O. Hospital and I operated a short time after. Both mother and child did well. She left on the twenty-first day, well and was nursing her baby. I think there was in this case an indication for abdominal Cesarean section, and that in suggesting it, I hope I was in accord with good judgment.

Dr. John F. Moran, of Washington, D. C.—I am thoroughly in accord with the indications given by Dr. Peterson for

Cesarean section, and to borrow a quotation from the President, Dr. Finney, it is "better to be progressively conservative than to be conservatively progressive." They are based on rational lines, and while the statistics prior to the last decade show that there might be some criticism as to this mode of operation, in eclampsia, and in placenta prævia, but I am sure, if Dr. Peterson had been given time to finish his paper he would be able to show that, in the last decade the improved statistics will more than warrant this method of interference, in these cases also, under definite but limited conditions.

Dr. Peterson (closing).—I have only a few words to add. I simply wanted to bring up this subject for discussion before the Society, since it is essential that surgeons and gynecologists be familiar with the indications of abdominal Cesarean section, for they and not the obstetricians perform most of such operations.

Obviously it was impossible in the time at my disposal to consider all the indications for abdominal Cesarean section. Hence, only the most important were considered. I can readily understand that under some circumstances extreme adiposity and edema of the vulva might be indications for this operation. Recently I had a threatened eclamptic patient with enormous edema of the vulva, which I managed to reduce by puncture. A subpubic operation would have been impossible with this patient on account of the edema.

A contraction ring, as brought out by Dickinson, may at times call for a Cesarean section to avoid the danger of rupture of the uterus when attempts are made to deliver from below. The same may be said of certain malpositions. But these are the rarer indications, and for this reason were not touched on in the paper.

As time goes on, abdominal Cesarean section for eclampsia will be more and more under discussion. That I have been able to collect 425 cases of this operation for this obstetrical complication shows how common the operation is becoming, especially when we consider that more than one-half of these operations were performed in this country.

To show you how common the operation has become and how necessary it is to discuss it in all its phases, if we are to ascertain its true position in obstetrics, I desire to quote from a letter I have just received from a fellow of this Society, Dr. Mullally of Charleston, S. C. He says: "Since writing you

some months ago, it might interest you to hear that I have operated eight times for puerperal eclampsia by abdominal Cesarean section without a death, either of the mother or child."

I found one man just outside of Pittsburgh, who had operated fifteen times for eclampsia, by the abdominal route, with a loss of only one mother. In the face of such statistics, it is foolish for the obstetrician to refuse to admit that the operation has a place in the treatment of eclampsia.

FURTHER REPORT ON NITROUS OXIDE OXYGEN ANESTHESIA

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Having, in conjunction with my associate, Dr. Culpepper, previously discussed the subject of nitrous oxide oxygen anesthesia quite fully before other societies, my purpose now is to relate some further impressions based upon wider experience with the anesthesia.

We have had in all at our hospital fifteen hundred cases. While this number is small compared with the larger clinics, yet it is large enough to justify us in drawing certain conclusions, and making some positive statements.

In this number of consecutive cases, *there has been not a single fatality,* that could be traced either directly or indirectly to the anesthetic. Further, there have been no post-operative complications, such as pulmonary embolism, stomach dilatation, pneumonia or nephritis. There were only two cases of phlebitis, in each of which there seemed to be a special cause outside of the possible effect of the anesthetic. A number of the cases were such bad risks that we would not have dared to give them chloroform or ether. The list embraces practically all varieties of surgical and gynecological operations, and includes tonsils and adenoids.

The ages of the patients varied from a few months to eighty years. The average length of the operations was about forty minutes. We use the anesthetic in our longest operations, although we have never operated on one case

longer than an hour and a half, being on principle opposed to prolonging operations beyond that point.

Blood pressure does not appear to be affected by our method, though we have taken it in only a limited number of cases. Shock seems to be much less than with ether or chloroform, and our opinion is that the anesthetic itself produces no shock. We follow the rebreathing method, as advocated by Gatch, using a fresh mixture every two to four minutes.

Our whole apparatus is simple, less costly than those on the market, and consists essentially of a mixing chamber with a bag below, the chamber being connected with two nitrous oxide and one oxygen cylinders, and having on top a small drip cup for ether. A large tube conveys the mixed gases to the inhaler. A rubber cup connects the inhaler with the face and effectually excludes air.

We have been using nitrous oxide for many years. During the past three years we have developed our apparatus and method coincidently with, but independently of, other workers. Our efforts have been especially directed toward simplicity and safety.

An essential feature of our improved method is that *there is at no time the slightest cyanosis*. This we *always insist upon*, and we believe, makes the method practically free from danger.

The cost is approximately fifty cents an hour.

Following Dr. Crile's excellent advice, we precede the anesthesia by morphine, although we combine it with atropin instead of scopolamin. We also infiltrate the tissues "before the knife" (by Crile's method) with novocain, which we believe to be a distinct advantage. This infiltration helps us in several ways. First, it lessens shock. Second, the incision may be made more promptly. Third, relaxation is facilitated. Fourth, it lessens the pain from the sutures afterward.

The time-saving advantage of nitrous oxide oxygen de-

serves more than passing notice. It is our custom to start the final preparing of the skin as soon as the anesthesia is begun. The moment the towels are in place, the skin is infiltrated and the operation proceeds. After the operation, by the time the dressings are applied, the patient is wide awake, usually in a more or less pleasant frame of mind, and may at once be carried to the ward without fear of disturbing other patients.

Nitrous oxide oxygen is undoubtedly exceedingly difficult to administer in a satisfactory and systematic manner. To be successful with it, the anesthetist must be well suited for the work. The study should be a pleasing one to him, he should be well endowed with common sense and should be tactful in the handling of the patients. One cannot properly master the work with less than six months' careful training and experience, and longer would be better.

It may be presumptious on my part to take issue with some of the surgeons present at this meeting, but frankly, I cannot agree with the prevailing tendency to go outside of the profession for anesthetists. In my humble judgment, the anesthetist, whether man or woman, should, to start with, be a well-educated physician. In making this statement, I mean no possible reflection on the work which is done at some of the large clinics, especially with ether. I have only the greatest admiration for the perfection attained by these splendid workers. They are, however, the exceptions. I still maintain that for the surgical profession in general, it is better and safer to have trained physicians to do the anesthetizing. We have already been only too slow in taking steps to safeguard our anesthetic work. Many of you remember the time, only a short while back, when the anesthetic, even in difficult cases was entrusted to the most unskilled and least trained assistants. We have taken a step forward in demanding trained anesthetists. Don't let us go backward by making anesthetists of untrained people.

With nitrous oxide oxygen it is more of an advantage than a disadvantage that an expert is absolutely essential.

The beginner with this method should see the anesthetic properly given as much as possible, and should himself, start with the simplest and shortest cases.

There are a number of difficulties in the way. The patient goes under so quickly, and recovers consciousness so promptly, that the equilibrium of complete and relaxed anesthesia is so extremely sensitive as to be difficult to maintain. The anesthetist has to be "on the job," to use a slang phrase, every moment of the time.

Ether if used must be added most judiciously. In more than half of our cases, we use none at all. In most of the laparotomies we use a little at the time when complete relaxation is demanded. The amount employed varies from a few drops to two drams. In the rebreathing method ether cannot be given in any considerable amount without bad effect.

Those of us who advocate nitrous oxide oxygen, are obliged to admit that relaxation is the most difficult problem that confronts us. To accomplish this without producing the least cyanosis, is the problem that requires the expert to solve. This is the rock on which have foundered many would-be users of nitrous oxide, and from this difficulty, directly and indirectly have emanated the unreasonable and unjust criticisms of the method. Admitting that an expert is necessary to properly administer the anesthetic, one well trained in this particular anesthetic, and not simply an etherizer, no one should criticize the anesthetic because untrained anesthetists usually working with faulty apparatuses and methods, have had uncomfortable and disastrous results. As well may we criticize surgery because of the bad results following the work of untrained surgeons.

Surgeons should be fairer in their criticism, and should base their opinions on the work of such anesthetists as

Gatch, formerly of the Johns Hopkins, Crile's excellent assistant, and Culpepper of our own clinic.

One of the minor difficulties of nitrous oxide oxygen is the occurrence of nausea. Fortunately it is very rare. Strict preliminary preparation of the patient will prevent it. When it does occur, the mask has to be removed and the patient regains consciousness. The operation is stopped, but only for two or three minutes, when the patient is again asleep. Nausea after the operation does not occur, or is very slight. This is one of the most attractive features of nitrous oxide.

As yet we have not used the anesthetic in negroes, since by our method, the amount of oxygen is regulated by the color of the skin.

The advantages of nitrous oxide oxygen over ether or chloroform are many and important. No description of the method can do it justice. One must see the administration *properly carried out* to appreciate it fully.

The depressing effects of chloroform are not seen. The anesthetic seems to be perfectly safe. In our cases, we recall not a single one where the anesthetic added a particle to the risk.

The disagreeable features and irritating effects of ether are lacking. There is no fear on the part of the patient, the gas is pleasant to smell and taste, it causes no suffocating feeling, its effects are very prompt, the patient going under in from one to four minutes and recovering consciousness just as quickly. There is no irritating effect on the respiratory tract, no mucous formation, no irritating effect on lungs or kidneys. Delirium is rarely present before, during, or after the operation.

Nausea is either absent or reduced to a minimum.

What more could we desire? Is this not a wellnigh perfect anesthetic?

Then why is it that so many prominent surgeons are not using it at all, or only in selected cases?

I have personally talked with many of them, and there are many answers to the question.

Some have perfected their method of administering ether to such an extent, and have such splendidly trained etherizers, that they are unwilling to make a change. Some have been influenced by adverse reports coming from sources where usually untrained anesthetists or faulty methods were employed. Others have the idea that the apparatus is complicated and the method costly. The main reason is that they have not seen the anesthetic given in a way that would properly demonstrate its overwhelming advantages.

Opinion is, however, rapidly changing. Even our own modest clinic has been visited by quite a number of surgeons and anesthetists, and without exception, as far as we could judge, they have been most favorably impressed by the method; the majority of them stating that they personally would not take any other anesthetic if they had to be operated upon themselves.

The complicated and expensive machines which have flooded the market, have done as much as the untrained anesthetists to bring the method into disrepute.

I believe, however, that the profession is rapidly getting to view the matter in its proper light, and I think I can safely predict that in a year or two, there will hardly be a well-equipped hospital in this country that will be without a proper apparatus and a well-trained anesthetist administering what is undoubtedly so far the safest and best of anesthetics—nitrous oxide oxygen.

DISCUSSION

Dr. Francis R. Hagner, of Washington, D. C.—I would like to relate an experience that occurred some months ago. A patient was brought into the Garfield Hospital with profuse hemorrhage following instrumentation for the relief of urinary obstruction due to hypertrophied prostate. The patient

had fainted twice from loss of blood, but at the time I saw him his pulse was full and bounding, and his face was rather flushed. As his bladder was distended with clots and the bleeding continued, I suggested a suprapubic cystotomy. While waiting for the anesthetist to give oxygen and nitrous oxide he had a stroke of apoplexy. If this man had received nitrous oxide and oxygen doubtless that anesthetic would have received condemnation. I think anesthetics sometimes are unnecessarily blamed for accidents or fatality.

Dr. I. S. Stone, of Washington, D. C.—I would like very much to have the privileges of the floor extended to Dr. Lowe, who is an expert, having administered many thousands of anesthesias, and I think his experience in regard to the variety of anesthesia would not only be interesting but important to the members of this Association.

Dr. Thomas F. Lowe, of Washington, D. C., (by invitation).—I have been engaged in the administration of anesthetics for the last ten years, and during that time I have given a little over 12,000 anesthesias. I have had very little experience with nitrous oxide, except at the start of my career as an anesthetist. We would start with nitrous oxide and then switch to ether. My work has mainly been confined to ether and chloroform. In a little over 12,000 anesthesias I have had one death, and that one death was from chloroform. The case was interesting because it brings out the question of fear as mentioned in the theory of Dr. Crile. This woman had been operated on a year previously and stood the anesthetic well. She had taken a trip abroad with a friend. Her friend was operated on and died under the anesthetic. This produced mental depression and had a profound effect on my patient's mind. Previous to being operated on a second time or previous to receiving an anesthetic a second time, the patient went to see a fortune-teller and was told that she would die under the anesthetic. I had that also to contend with. When I saw that patient in the anesthetic room before beginning the anesthetic. I noticed she had a slight enlargement of the thyroid, her pulse was fairly rapid, showing some of the symptoms of exophthalmic goitre. I started the anesthetic, chloroform being the selection at the time. The patient had taken the anesthetic about six minutes, and 2 drams of chloroform were administered by the drop method. Up to that time it usually would require about 4 drams of chloroform to get a patient

under in about five minutes. While I was giving the anesthetic the patient kept on saying "I am going to die; I am going to die." I tried to persuade her to stop saying that, but she kept right on until suddenly she stopped breathing. We could get the pulse for twenty minutes after she stopped breathing, and could hear the heart beating by stethoscope for forty minutes. We practised artificial respiration and the usual methods of resuscitation for an hour or more, but the patient collapsed.

I have not had much experience with the new method of nitrous oxide and oxygen, consequently I am unable to make any satisfactory remarks on that subject.

Dr. Herman J. Boldt, of New York City.—I was much interested in what the doctor had to say with reference to nitrous oxide anesthesia combined with oxygen, for the reason that I have used this method in selected cases for over ten years. On one occasion I used it during an operation that lasted over three hours. The objection I have to it is the one recited by one of the speakers, namely, in abdominal work it does not give satisfactory relaxation. Dr. Leigh, in his remarks, mentioned the fact that he used novocain infiltration. The question arises, How much is dependent for the anesthetic effect upon the infiltration with novocain, and how much is dependent upon the nitrous oxide and oxygen? We know that extensive operations can be done under novocain infiltration. I saw quite a number of such operations done abroad last summer, in the Bier clinic, under novocain and the result was very satisfactory.

The other objection we have found and which I am pleased to hear mentioned by Dr. Leigh is the question of expense. As a routine method, it costs too much money to use nitrous oxide and oxygen, particularly so in hospital practice. We have limited the administration of nitrous oxide and oxygen to patients in whom ether or chloroform are contra-indicated.

Dr. Lewis C. Morris, of Birmingham, Ala.—My experience with gas-oxygen anesthesia leads me to endorse practically all the statements made by Dr. Leigh. About a year ago I had one disastrous experience. A woman came into the hospital with a chronic interval appendix, who had a moderately severe laceration of the cervix, and she was given gas-oxygen anesthesia for the repair of the cervix. She was given the anesthetic by a man who had given over a thousand gas-oxygen anesthesias. Without any warning at all, just about the time the

laceration of the cervix was completely repaired and the operation finished, the patient's heart stopped beating. She breathed for, I suppose, half a minute to a minute afterward, and then was dead. This woman came into the hospital for the relief of a minor surgical condition; the anesthetic was given by an experienced man, and yet she died. Examination before the operation showed the patient had a mitral lesion, but the anesthetizer went over her and thought her condition offered no contra-indication to the anesthetic.

I would like to ask Dr. Leigh what he considers the contra-indications to gas-oxygen anesthesia.

Dr. Charles R. Robins, of Richmond, Va.—I have been using this anesthetic in my own operations for a period of fifteen months, and the man who gives the anesthetic learned the method while working under Dr. Bloodgood. I can endorse everything that has been said about the advantages of this method of anesthesia, and I simply want to say a word in regard to the mortality from gas-oxygen anesthesia.

In one of the meetings of a Southern medical society, the Tri-State Medical Association I think it was, a statement was made by one of the members that one surgeon from Richmond had had three deaths from this anesthetic in a few months. As I was the only man at that time using it, or rather the hospital with which I am connected was the only one using it, I simply want to make a statement in reference to two deaths, which was the correct number that occurred. One of these occurred in a colored woman who had a contracted pelvis in whom delivery was impossible. She had been in labor three days, and just before she was brought to the hospital she had been given chloroform for five hours, and numerous attempts had been made by country doctors to apply forceps, and when she arrived at the hospital she was in a deplorable condition. She was given gas-oxygen anesthesia, and died, but I do not believe death was due to the anesthetic, I think she would have died under any anesthetic. The reason we gave gas and oxygen was because we thought the operation could be more safely undertaken under that anesthetic rather than under any other.

Another case was post operative in which we supposed there was marked abdominal hemorrhage. We did not operate on the patient at all for two or three days because her condition was so extreme that we thought she was going to die anyway.

She rallied a little, and we gave gas-oxygen anesthesia, and by the time we got the abdomen open she died, but death cannot be ascribed to the anesthetic.

In the length of time I have mentioned I have done about 600 or 700 operations, most of them abdominal, and the effect of the anesthetic, as shown by the pulse and respiration, the absence of shock, the quick recovery from the anesthetic, and the absence of nausea, have been so gratifying as to make me adopt it as a permanent anesthetic. The only class of patients to whom I do not give gas and oxygen are to colored people, and the reason is because you cannot tell about cyanosis.

Dr. Joseph Ransohoff, of Cincinnati, Ohio.—No more important subject than this can come before the Association, and I rise to remark that perhaps many cases of death are attributed to the anesthetic used when the death is not the result of the anesthesia at all. Take a patient who has been on the operating table for twenty minutes, who has had large vessels tied off, and dies, in that case death cannot be said to have resulted absolutely from the anesthetic. I remember seeing one case where the knife had not been used, where before the patient was brought on the operating table death had ensued. I have seen a number of cases of that kind. If a patient has been on the operating table and has had large vessels tied off, operated for thirty minutes, and death follows, it is not fair to charge the death to the anesthetic.

A man in my service was operated on for appendicular abscess. His mother sat at his bedside about twelve days after the operation, chatting with him, the patient turned up his eyes, and was dead. I know of a case operated on in Chicago for the radical cure of hernia. On the ninth day the husband's wife left for the purpose of taking him home, and the man dropped over dead suddenly from pulmonary embolism. Now, if these things can occur twelve days after operation, why can they not occur during the operation? Death from anesthesia, therefore, cannot be considered as due to the anesthetic if the operation has proceeded for any length of time and if a number of vessels have been tied off.

I am an absolute convert to the new anesthetic, and yet I have had one fatality from it. The charge is made that this method of anesthesia is expensive. That must be disregarded when we consider the safety of the patient. One word more and I have finished It can never become a general anesthetic;

it will require an expert to give it, and we must remember that fully 60 per cent. of the anesthesias must be administered away from hospitals, on the farm, in small houses, in cabins, by individuals who are not in the habit of giving anesthetics. Let us, therefore, not pay too much attention in our instruction to the most difficult method, if it is a safe one, but let us still devote much attention to giving anesthetics in the way that a man who is not an expert can give them. Let us not forget that chloroform and ether have certain values, and they are after all the anesthetics that will have to be administered by the general run of doctors who give anesthetics occasionally or semi-occasionally.

Dr. Leigh (closing).—I am sorry Dr. Crile had to leave because I was anxious to have him give us his views about this anesthetic. I was impressed while attending his clinic with two points of difference between his method and ours. He does have some cyanosis, or did have when I was there. The other point is that he does not use rebreathing. He had a continuous stream of oxygen and nitrous oxide. My associate, Dr. Culpepper, is an expert in administering it, and we have another man who has been giving it seventeen months and gives it well. We have never had the slightest trouble with it. I have heard recently of some serious trouble among negroes. I would urgently advise that the anesthetic be not used among negroes until there is some way of telling whether a negro is cyanotic or not. Otherwise it is absolutely unsafe.

In the discussion of Cesarean section for eclampsia, I was particularly impressed with the idea that in these cases nitrous oxide oxygen is a safeguard. I had a recent case of uremia without convulsions. The pelvis was abstructed by a growth. The urine was loaded with albumin and patient was in bad shape. She had not the slightest trouble of any kind following the operation of Cesarean section. I used nitrous oxide and oxygen in her case.

Dr. Boldt spoke of infiltration. We do not use the infiltration method to aid the anesthetic, although it does permit us to begin the skin incision a little earlier. We find no particular difference in the anesthesia when we do not use novocain. But I am a strong believer in Crile's theory and method in regard to the use of novocain, and I use it freely.

I do not think death in Dr. Morris' case was due to the anesthetic if the color was good.

As to Dr. Morris' question, I know of no contra-indication to the use of this anesthetic except negroes and throat cases.

As I said in the beginning, we have had 1500 cases and I think that number is large enough to base our opinions on. We have never noted at any time any depressing effect from the anesthetic in all these cases.

We get perfectly good relaxation, but it is difficult to obtain it. We must admit that the surgeon is put to a little more trouble in some abdominal cases with nitrous oxide oxygen than with ether. But he should not mind it when he knows that it is so much safer for the patient.

THE APPLICATION OF IODINE TO THE EXTERNAL AND INTERNAL GENERATIVE ORGANS OF WOMEN IN THE TREATMENT OF INFECTIONS AND PREPARATION FOR SURGICAL OPERATIONS ON THE SAME

By J. Wesley Bovée, M.D.
Washington, D. C.

The antiseptic properties of iodine have been known as long as have bacteria and probably for surgical purposes use of it antedated that of phenic acid. The oldest surgeons of today recall its use for such purposes in their earliest association with surgical work. These men resent the claim of priority or discovery of the comparatively recent employment of this element by the Grossich method or some of the later modifications of it. They see nothing original in Grossich's (*Centralbl. f. Chir.*, October 31, 1908, No. 44, p. 1289) report of his experience with preparing the operation field with iodine alone and by a technique directly contrary to any previously employed. He absolutely and correctly used it as a complete substitute for the various manners of preparation of the field of operation in vogue at that and all preceding time. Various and multitudinous have been the claimants for priority over Grossich. Many of them refer to publications of years back for substantiating evidence of their priority. Having been interested in this iodine work I carefully investigated these claims, and as they have so uniformly lacked in proof I have ceased search-

ing literature on the subject of priority and cheerfully accord to Grossich the honor and credit of first recommending and first using iodine by painting as a complete method of skin preparation for surgical operations and especially, *that the skin must be dry to be best effected by the iodine.* This special observation is the most important feature of this improved process.

There were disadvantages of this method and probably the greatest was the frequent and ofttimes severe dermatitis that followed the application of the iodine. It arose largely from two causes: (1) Using a tincture of such concentration as to be extremely irritating and (2) applying it in too large quantities, permitting it to run down in streams and these streams to coalesce. Then as the alcohol of the tincture evaporated, thick deposits of iodine crystals were left in the recesses and on the surface of the skin. Dermatitis and blisters, even of large areas, ensued and were troublesome. Nearly four years ago I determined to overcome this disadvantage, if possible. Greater care was employed in painting the skin and no streams were allowed to form. I was using but 1 per cent. of the crystals in absolute alcohol for catgut preparation, which had been proved by the late Dr. James Carroll, U. S. A., to be ample to absolutely sterilize it and the tincture I was using on the skin was 7 per cent. Therefore, I thought it wise to find some preparation of iodine and alcohol between 1 and 7 per cent. that would be at the same time both reliable as a germicide and less irritating to the skin. After nearly two years of experimental work conducted in the operating room and by the late Dr. John S. Neate, bacteriologist of The Army Medical Musuem, 3.5 per cent. of iodine crystals in 95 per cent. alcohol was determined upon as being the weakest absolutely reliable preparation. This experimental work was embodied in a paper read at the 1911 meeting of The American Gynecological Society (see TRANSACTIONS for 1911, and *Amer. Jour. Obst.*, 1911, lxiv, 91 to 106). Iodine tincture of

that strength I used at the same time for plastic surgery about the perineum, vulva, vagina, and uterine cervix and cavity. This work was then extended to the tubal mucosa and finally to the peritoneum. About sixteen months ago I took up carefully and systematically the treatment of infections of the uterus and appendages with this tincture of iodine, having used it considerably for such conditions of the vulva, urethra, and vagina. After a very large experience with it I remain enthusiastic over its value as a germicide on the mucosa of the uterus and Fallopian tubes and on the pelvic peritoneum.

My colleague in Columbia Hospital for Women, Dr. I. S. Stone, has been deeply interested in the subject under discussion and I would invite your attention to his two published papers, one in the TRANSACTIONS of this Society for 1909, and one in the *Virginia Medical Semi-Monthly* in 1912, xvii, 105. Dr. Stone uses but 25 per cent. of the United States Pharmacopœia tincture, an equivalent of 1.75 per cent. of the crystals of iodine. In that respect we differ, as my bacteriological findings, I think, justify the use of a minimum strength twice as great as 3.5 per cent. of the crystals, and these dissolved in 95 per cent. alcohol.

CONDITIONS IN WHICH THIS TREATMENT IS APPLICABLE

This remedy may be profitably applied in the following class of conditions.

1. Acute infections of the vulva, vagina, urethra, and the whole of the endometrium.

2. Acute peritoneal infections with proper limitations.

3. Chronic conditions following infections of these structures and of the tubes, ovaries, and pelvic peritoneum.

4. In pelvic surgery requiring examinations, manipulations or operations on or through the vagina.

5. In such procedures as require opening the cervical canal or uterine cavity from either the vaginal or peritoneal side.

6. As a routine method of preparation of the field of operation on all these structures as well as the rectum.

For several years I have confined the treatment of recent and remote Neisserian infection of the vulva, urethra, vagina, and cervix to the application of iodine. I have great confidence in the efficacy of this remedy when applied early. If the condition may be treated before the infection has passed into the uterine cavity or the glands of Bartholin it can often be eradicated by one thorough painting of the exposed areas below the uterine cavity. If the first application fails a second made three days later commonly succeeds.

Such applications can be made to the vagina and cervix with scarcely any unpleasant feeling being caused, but usually considerable burning and smarting follows painting the vulva and perineum and sometimes pain if Skene's glands are thus treated. If either the vulvovaginal or Skene's glands are involved I make the same vigorous onslaught, and if the corporeal endometrium be involved the uterus is injected under slight pressure, the patient being anesthetized for the purpose. Should the infection be due to some other agent the same identical treatment is employed. I have not been sufficiently courageous to attempt to employ this plan of treatment, injecting iodine into the uterus under sufficient pressure to drive it into the Fallopian tubes, in acute infectious conditions of the tubes, either suppurative or non-suppurative. I fear highly virulent tube contents that had not been thoroughly subjected to the iodine bath might be forced through the tubes and scattered over the peritoneum. We all understand how this might occur in pus tubes about which the adhesions are so slight as to be easily separated. When for any purpose the peritoneal cavity is opened I frequently and unhesitatingly apply this

preparation of iodine to areas infected, however acutely. Nor do I limit its use to applying it sparingly. Nor do I hesitate to bathe the outer side and, with the syringe, the inner side of a Fallopian tube. I have been amazed at the beneficial effects of such intraperitoneal and intratubal application of iodine. When one has first treated acute and subacute localized peritonitis thus he is not prepared to find the notable freedom from gaseous distention and from localized pain and the comfort manifested by the patients continuously from the time of operation.

In chronic conditions arising from infections of any portion of the female genital tract I freely apply the iodine and aim always to have it reach the pelvic peritoneum through the uterus and tubes, whenever these structures are involved. It is now my uniform procedure in subacute and chronic pyosalpinx to inject the uterus and tubes as well as possible with iodine before opening the abdomen. If the appendages are matted down and degenerated from a former infection the remedy is similarly applied.

In pelvic surgery that requires examinations, manipulations or operations on or through the vagina, this plan of local sterilization is far superior to any other I have used. I have found it has enabled me to revolutionize my surgical teaching. Before employing iodine for preparing surgical fields the time required for such work, although with less perfect results, required many hours, and even when the patient was anesthetized and otherwise ready for operation a considerable delay was necessary for a thorough scrubbing of the field. Having determined that iodine requires a maximum of two minutes to prepare the field I now place the anethetized patient on the operating table and have several students of my classes examine her, after which the iodine is applied and the field thus quickly prepared. The time required for these examinations and iodine preparation is not more than the old scrubbing methods demanded. If complete hysterectomy from above is required the pre-

liminary sterilization of the vagina is of distinct value. If in other pelvic operations done through the abdomen vaginal drainage is employed the value of this sterilization is appreciated. The importance of this vaginal application of iodine is emphasized in radical operation for cancer of the cervix uteri. The high mortality from infection of the peritoneum as a result of breaking of the specimen during its removal and resulting leakage is a striking feature of the recent report of Wertheim's work in this field. This sad complication is best obviated by the use of the iodine to both the vagina and endometrium, preceded by galvano-cauterization with or without curettement, if excrescences or craters be present. Since the etiology of cancer is not known I would warn against driving any cancer material beyond the uterus by employing considerable pressure in injecting that organ.

If the cervical canal is to be invaded during a surgical operation no little comfort arises from security incident to knowing it is sterile. This is quite a feature of the supra-vaginal amputation of the uterus. An advantage in having the uterine cavity previously prepared is evident when hysterectomy or hysterotomy is to be done. Myomectomy and even curettage of the uterus are performed transperitoneally and call for surgically clean fields. A noteworthy fact, noticed in my work of the last two years, is that the more I have used iodine in the uterus and observed its effects the less I have done curettage. I now recall no gynecological condition of the uterus that stands as a contra-indication to the injection of iodine into its cavity and I rarely open the pelvic peritoneal cavity without first preparing the surfaces around the introitus, the vagina, and the uterine interior, if not the tubes, with the 3.5 per cent. preparation of iodine. I will not describe the mode of applying iodine to the skin surfaces, the vulva, and the vagina, further than to say that a Sims speculum is used for retracting the perineum in exposing the vaginal walls and cervix. Enough

iodine will be left in the vagina after painting the exposed surfaces to coat over that area covered by the speculum, as soon as the instrument is withdrawn. Exposure of the cervix may be made by either the Sims speculum or some other retractor and it is grasped by a vulsellum and held firmly for the injection. A two-ounce glass syringe having a conical end about two inches in length is loaded with the iodine preparation. It is now inserted into the uterine cavity and the fluid slowly injected with or without pressure, as one elects. If pressure is employed the syringe is held in place for a period of time, sometimes as long as two minutes. If the peritoneum is to be reached considerable force and perhaps one or two minutes' time as well as all the solution will be required. If only the uterus is to be treated and the tubes avoided, half the solution given with slight pressure, quickly stopped, will be all that is required. Moreover, if the tube in the latter place be not pressed to the hilt in the external os uteri a return flow will be provided which lessens the probability of tubal invasion.

DISCUSSION

Dr. I. S. Stone, of Washington, D. C.—This subject is one of the utmost importance. I do not know why iodine was so long used, and yet so cautiously used, by so many surgeons. As Dr. Bovée has said we use it continually. I have used it ever since graduation as a germicide. I have written a paper on this subject which will appear in the *Journal of the American Medical Association,* which will tell quite a good deal about the special work which has been mentioned by Dr. Bovée. In this respect, I want to say that my colleague and myself are as one in all essentials in regard to the use and success following iodine. There are only a few drugs we ought to use as a matter of routine, but when we get hold of a principle and ascertain that one antiseptic is better than another, it is better to have routine practice. When using bichloride of mercury, one to one-thousand, for all kinds of sterilization, we would sometimes use it for five minutes, and rarely for

ten minutes. I never saw a surgeon spend more than ten minutes of his time in using bichloride of mercury for sterilization. Yet if you will read the various reports as to the length of time required to sterilize the skin, you will find it takes thirty minutes for bichloride of mercury to produce the same amount of sterilization that iodine will do in from two to five minutes. Some of my friends have heard me say the first time I resorted to tubal sterilization was about eighteen years ago; I will say now, I learned by chance that it was possible to inject tubes through the cervix and uterine canal nearly twenty years ago. It was a most important case, but I think I have referred to it in this forthcoming report. It was not until about five years ago I took it up as a regular method to be used where I suspected acute infection of the Fallopian tube. We do not see a great many cases where pus is dropping or flowing in the fresh and acute variety of infection. However, I not only use it in that variety, but have used it in the chronic cases where, in all probability the tube was useless. That is to say it was useless so far as the mucosa was concerned, but I believe I have firmly established the possibility of relieveing a tube of its active dangerous qualities, due to gonorrhea or other forms of infection and have left the woman with a tube which may have its mucosa destroyed or may not, yet I believe such organs ought to be preserved when it is safe to do so. It has been thoroughly well established that the tube may not only be reached through the uterus, but from its distal extremity also. We frequently inject the tube by using iodine solutions in an ordinary glass syringe and have no doubt about its value when used in this manner. That is a very important point.

I do not know that Dr. Bovée will quite endorse what I am going to say, but I do not think I have sacrificed many tubes; in fact, I think I am leaving 75 per cent. of these tubes and the corresponding ovary, whereas previously such adnexa were removed. I consider this one of the most important steps in advance made in years. We are having numerous cases where we leave one appendage, and if only a part of a tube is left, it is possible that woman is better off, physiologically at least, with the tube or part of it with one adnexa, than to be unsexed entirely.

Dr. Henry O. Marcy, of Boston.—We have listened to a very interesting and instructive paper. Tincture of iodine

was used freely in the days of the Civil War. Much was said of its stimulating effects, wounds were cleaner, granulations healthier, and repair processes more rapid. After a time we drifted away from its use because we did not know the reason why it was of value. When a student in Germany, in 1869 and 1870, I learned the great value of iodoform, and since then I have used it almost daily, because it is 95 per cent. iodine. Iodine is slowly set free and its antiseptic effect is dependable for days after a single application. Dr. Bovée and Dr. Stone deserve a great deal of credit for their persistent use of iodine, and I congratulate them upon their most important work in connection with it.

Dr. Ernst Jonas, of St. Louis.—There is one point of importance to be borne in mind in the use of iodine, and that is always to use a freshly prepared tincture of iodine of the strength recommended by Dr. Bovée. Old tincture of iodine, especially if exposed in uncorked bottles permitting the evaporation of the alcohol, contains a much greater percentage of iodine. Such tincture is no longer the official tincture of iodine of the 7 per cent. strength, but a tincture of indefinitely greater per cent. It is not surprising, that after the use of such old tinctures irritation of the skin and eczema occur.

Dr. Stone.—I do not think the last remark, however well intended, goes far enough. If you leave the bottle open long enough, the iodine will follow the alcohol and the bottle will be empty.

CANCER OF THE UTERUS

WHICH IS THE PREFERABLE OPERATION?

By H. J. Boldt, M.D.
New York, N. Y.

There is no subject in gynecological surgery that has received more attention from leading gynecologists the world over than that which I now propose, without statistical citations, to place before you for consideration.

I believe that all gynecological surgeons are agreed that the vaginal extirpation of a carcinomatous uterus, particularly by the method generally used, gives a much lower primary mortality than the extensive abdominal operation. But we are also agreed, that when the disease has its origin in the cervix, even though it be still in seemingly the beginning stage (the early stage of epithelioma of the *vaginal portion* of the cervix is not included), the percentage of recurrence is very large. Then, as to ultimate cure—that is, no recurrence within five years after operation—we should bear in mind that a question sometimes arises whether a particular specimen that was submitted for microscopical examination was really carcinoma. Such differences of opinion among pathologists even of good reputation are not unusual. Such questions, however, only arise over specimens that present atypical features under the microscope. Just as numerous instances of reported benign conditions, proving subsequently malignant, are known to us, so the reverse is not infrequent.

But even at this time there is no unanimity of opinion as to which is the best technique or the best method to follow when operating for cancer of the uterus.

My old friend, Hofrat Professor Schauta, told me, during the past summer, that with the technique of vaginal hysterectomy devised by him, and practised in his clinic, the ultimate results are equal to those of his confrère, Professor Wertheim, of the second gynecological clinic at Vienna; whereas the primary results are far superior. In that clinic, it is true, the chief and his assistants, particularly Doctor Cristofoletti, are artists and masters of the technique, and undoubtedly, any one who has seen the work there will acquiesce in the assertion that the parametria are more extensively removed by them than is generally done in vaginal hysterectomies. This is, in my opinion, the only proper method of doing a vaginal hysterectomy for cancer of the uterus. And while I myself have done vaginal hysterectomies somewhat similarly, I did not remove the parametria so extensively as do Schauta and his pupils. The features of importance are these: An extensive paravaginal section must be made; and it should extend about 2 to 3 cm. behind the anus. The vaginal cuff, which is next made, takes as much of the upper part of the vagina as is thought to be necessary—usually the upper third. By such an extensive paravaginal section, one makes for one's self an adequate approach to the field of work. The bladder must be well pushed off, particular care being given to the lateral attachments, so that the ureters can be fully exposed to permit tying the uterine artery outside of them. Only in this way can we get the parametria free enough to extirpate extensively.

But does that method really permit one to do as satisfactory an operation as the abdominal route? Formerly I thought that it did; but in spite of what Schauta asserts for it, despite indeed the excellent ultimate and primary results, I would limit its field of application to women who

are very obese; to the very early stages of epithelioma of the vaginal part of the cervix; and to cancer of the body of the uterus. But particularly would I give preference to the vaginal operation in the varieties mentioned, should the patient's age be past fifty years, since at that age, and beyond it, the disease is not so likely to have affected the glands. Although I included early epithelioma of the *portio vaginalis* as an indication for vaginal hysterectomy, still, if the condition of the patient be in every way favorable, the abdominal route is, I believe, the more desirable.

The abdominal route undoubtedly does permit the parametria to be extirpated more extensively. Moreover, one has a better view of the field of work, and enlarged glands may be extirpated. While careful investigation has proved that the glands are but rarely affected in still operable instances of carcinoma of the uterus, nevertheless I myself have seen a carcinomatous gland at the iliac bifurcation in an early and easily operable case.

The fact that there are on record several cases of women still living without recurrence after five years, from whom carcinomatous glands were removed, is, it seems to me, sufficient argument in favor of the abdominal operation, if done radically. But an abdominal operation, to be of value for the cure of the disease, must be extensive. It must be really a radical operation, and not only called a radical operation. The simple exposure of the ureters when operating, and otherwise doing no more than an ordinary panhysterectomy, is a technique that will not give one iota better remote results than would that which was employed twenty-five or thirty years ago.

When doing the operation we must see that we have free access to the field of work; and the abdominal incision must be sufficiently extensive to permit this. Of the different kinds of incisions used to open the abdomen, none gives better nor, it seems to me, equally good access, as the transverse incision employed by Mackenrodt, of Berlin.

It differs from the ordinary transverse incision, usually called the Pfannenstiel incision, in that the recti muscles are cut close to their bony attachment, instead of only cutting the fascia transversely and then separating the muscles lengthwise, as in the old and generally practised abdominal section.

The next and a most important point is: Control all bleeding. This should be done as one proceeds with the operation. It is impossible to work in the pelvis without great danger of injuring the ureters unless one can work in a field free of blood. The parametria must be excised extensively, and any enlarged glands should be removed. There should be no oozing anywhere. The field must be dry before the pelvic peritoneum is closed over the raw surface. The question of pelvic drainage after such operations is still a moot point. The greater number of surgeons make use of it; I do not see the necessity if the precaution has been taken to control even the slightest oozing, and if one has done clean work.

It must, I believe, be obvious, that with the exceptions mentioned, the abdominal extirpation, done radically, should be the method of choice. And to better the primary results the employment of lumbar analgesia should find preference.

DISCUSSION

Dr. Reuben Peterson, of Ann Arbor, Mich.—Two years ago at the Nashville meeting of this association, I showed some slides of this operation and gave my results with this method. Since that time, I have continued with the radical abdominal operation for carcinoma of the cervix, since I believe it will give better results than will any other operative procedure.

I have had no experience with the Schauta operation, which has not appealed to me from the descriptions I have read of it. I intend to confine my efforts to the Wertheim operation. It is a procedure where experience counts for a great deal, as

shown by the fact that I lost 42 per cent. of the first 14 cases operated upon. Such a primary mortality for any operation is very discouraging to one who is not accustomed to such a high primary mortality in his operative work. My total primary mortality has now been reduced to about 25 per cent. in some 50 cases. Although through experience the primary mortality may be reduced, it will always be high for the various reasons brought out by Dr. Boldt. I persevere with the operation because by its means I am able to save more women than by any other method. But outside of improvement, due to an increase in dexterity, there will be very little decrease in the primary or secondary mortalities unless some means can be devised for getting the American women with this disease to the surgeon earlier. In Mackenrodt's and other European clinics, they are able to operate on 80 or 90 per cent. of patients with cancer of the cervix. The American surgeon is not able to perform the radical operation on more than 20 to 25 per cent. of patients with carcinoma of the cervix.

At the meeting of the Western Surgical Association which is to be held in Cincinnati in a day or two, I am going to propose that all the surgical societies in this country unite in a campaign of education, so that not only women with carcinoma of the cervix, but all carcinoma patients will come to the surgeon earlier. For until we can bring this about, our results will be lamentable, no matter in what field we may operate.

Surgeons have hesitated to begin the carcinoma campaign because they do not know the cause of this disease, as is the case with tuberculosis. But this we do know, if we can set before the public certain fundamental truths about cancer, patients will come to the surgeon earlier and more lives will be saved.

Dr. J. Wesley Bovée, of Washington, D. C.—I am very sorry Dr. Boldt did not give us some definite instruction as to the technique to be used in the treatment of this condition. I listened attentively for it and was disappointed. There is no question in my mind that cancer of the cervix uteri can be dealt with more easily by the vaginal operation, and I still can picture in my mind cases in which it would be the preferable procedure, as, for instance where it was accompanied by marked prolapse of the uterus, a large vagina, the woman with a severe cardiac lesion, etc. In such a case, if I could get hold of the cancer early, I would do a vaginal operation

rather than an abdominal one, but in no other condition in which I hoped to eradicate the disease by operation would I consider the vaginal route a proper one. Dr. Boldt did not tell us how to get a bloodless field of operation, which is a very important point. He says we should have it all bloodless, and we could not work very well without we had the operative field bloodless. I have never been able to get a bloodless field there. I have ligated the internal iliac arteries, the main trunk, the anterior branch of the internal iliacs, and one could judge more from the size of them than otherwise as to the amount of blood they carry to the pelvis, and I would get bleeding from the vaginal arteries. It saves trouble in trying to find the uterine artery and locating it. But when you get to the side of the vagina you begin to have bleeding from the vaginal arteries. This troublesome bleeding I find in doing the radical extirpation for disease of the cervix, that is, in coming alongside of the vagina. I try to remove all in one piece. I believe this operation gives the best results.

We see so much of what is called Wertheim operation, and I think it unfortunate that we Americans quote foreigners quite so much as we do, because I think the credit for this work really belongs to Emil Ries, of Chicago, and then next to him I would like to give credit to Dr. John Clark.

That is my position as regards the extensive work being done in the treatment of cancer of the uterus. Emil Ries devised the operation, and proposed it to Wertheim in 1895, and Wertheim did his first operation upon the lines suggested by Dr. Ries.

Dr. J. M. Hundley, of Baltimore.—I am glad to hear Dr. Bovée speak of the work of Dr. Clark. I know of Dr. Clark's work and first got my inspiration from him in doing the radical operation for cancer. It was while he was at the Johns Hopkins Hospital.

For about eight years I have been doing the radical operation invariably. I do not think I have done a vaginal operation in that time. Dr. Cullen asked me for a report of the results of my work that he might mention it at the recent meeting, which was held in New York, of the Clinical Congress of Surgeons. I tried to collect the cases, in order to find out what results I had obtained from the work I had done. I could only trace 16 cases. There were 30 cases concerning which I could learn nothing definite. But of the 16 cases I was able

to trace 4 who were living after this radical operation. I had seen Wertheim's work, but Dr. Clark was the first man I had seen do this thorough operation. Of these 4 cases that are alive, the longest period is eight years after the operation, and of the other 3 one is living after two years, another after five, and 1 after six years, which I think is a good showing for the radical operation.

Dr. Thomas S. Cullen, of Baltimore.—We are indebted to Dr. Boldt for summing up so clearly the situation regarding cancer of the uterus. I fully agree with those who have spoken that all cases where the patient is not very old, or there is not much obesity and where there is no marked prolapsus of the uterus that the radical abdominal operation is the one that should be performed. I have had 26 cases where more than five years have elapsed since the operation was performed. Of this number 7 died at the time of operation or shortly after operation, 11 died at periods varying from a few months to six years after operation, 1 was lost track of, and the remaining 7 are well today; 1 is well six and one-half years after operation; 1 is well eight years after operation; 1 is well eight years and four months after operation; 1 is well eight years and six months after operation; 1 is well nine years and eight months after operation; 1 is well ten years after operation; and 1 is well thirteen years after operation.

A microscopic examination of sections of the cervix will almost without fail reveal whether carcinoma exist or not.

Dr. Peterson tells us that the operation is uncertain. All should read the second paragraph of his article published in *Surgery, Gynecology, and Obstetrics* several months ago, for it gives the sum and substance in a nutshell.

I am also glad he has taken up the question of cancer publicity. At the New York meeting of the Clinical Congress of Surgeons of North America a few weeks ago it was unanimously agreed that the time had arrived for a campaign of publicity in relation to this disease. A committee of five was selected to carry on this campaign, and direct its movements. They were instructed to write or have written articles to be published in the daily press, weekly or monthly magazines, as might be deemed most expedient. The Congress fully realized that only by educating the people could any good be accomplished. The patients now don't come early enough. This committee has already made arrangements for articles

in several of the leading magazines and I am glad to say that Dr. Keen is going to give us a paper on moles. Our committee asks the hearty coöperation of this Association and I feel sure we will get it.

Dr. Rufus B. Hall, of Cincinnati.—I think the question of whether the vaginal or the radical operation shall be done, is one that ought to be considered from the standpoint of whether or not the patient comes to operation early or late in the disease. Vaginal extirpation can be made late in the disease, when you feel the time has passed when you can hope to cure the patient permanently. Vaginal extirpation can be made then for the prolongation of life and the comforts of the individual while she must live with a minimum danger from the operation.

Then, again, the question of whether the abdominal operation should be made for extirpation of the uterus, we should consider whether we will do extirpation without wide dissection, or whether we will do the operation with wide dissection, with a necessarily high mortality following the operation. I believe that we are not justified in late cases, that is, cases coming late for operation, *in making a wide dissection*, with necessarily a high mortality, over extirpation without wide dissection, with a lower mortality following the primary operation. One should not do wide dissections with the glands fused and enlarged, running up about the bifurcation of the arteries and veins, with secondary deposits in other places in the abdomen or on the viscera, which we feel occasionally when we least expect them. The wide dissection is necessarily attended with a high mortality. The patient will have a recurrence; therefore wide dissection is not justifiable. If we can get these cases early, the operation of Wertheim is the one that should be made because it gives patients the best chance for permanent recovery. I do not believe the mortality should be 25 per cent. if the technique is perfected by the operator, or 50 per cent. or anything like it. I think 25 per cent. is a high mortality for the primary operation. There is no question but that even in vaginal extirpation, if you get the case early, and the patient is near or has passed the menopause, many of these cases will remain well for a long time. I have a number of patients on whom I have made vaginal extirpation that have lived longer than five or six years. I have one living sixteen years since the operation

was done, and in this case I have the slides to show that this woman had an epithelioma of the cervix, so that the operation for vaginal extirpation ought to be considered carefully in some of these cases, and select the operation to suit the individual case.

Dr. Boldt (closing).—So far as the technique of the operation is concerned, it is not included in my paper, consequently I shall disregard it entirely. The technique will be brought out in an article in the February number of the *Journal of Surgery, Gynecology, and Obstetrics*, and it will take up the work that is being done in the European clinics now.

So far as the question of operability is concerned, it will depend upon the individual view which a man takes as to what is operable and what is not operable, and what is considered border-line and what is not considered on the border-line. While I was abroad I saw radical operations done on patients upon whom we would not attempt to operate radically. Where we consider an operability of 25 per cent. they will take the same class of patients and make an operability of 85 per cent. I do not think the ultimate results are as good as they ought to be.

With reference to the question of publicity of cancer, I believe we should go after this matter not through the lay press, but we should begin by educating general practitioners to make diagnoses early and send these patients promptly to us for operation. We know positively that we cannot tell anything about the early symptoms of carcinoma, except that a woman may have a little leucorrhea or bleeding, and usually, the earliest symptom is that of leucorrhea. When we remember the large number of women who have leucorrhea, and if we have that printed in the lay press, it is likely that a large number of women who are not neurasthenic may become so, they will go to see a doctor, and will be dissatisfied with the report which is made to them that they have no malignant disease, and they may go and consult somebody else, and so this question of malignancy will make a deep impression upon their minds. Therefore, I think we will gain much more by teaching or insisting upon the family physician in being conscientious in his teaching to his patients and inducing them to seek advice at the first sign of suspicious symptoms, and the suspicious symptom should be taught by the family physician rather than by the daily press.

GASTRIC AND DUODENAL ULCERS, WITH SPECIAL REFERENCE TO METHOD OF OPERATIVE PROCEDURE EMPLOYED

By Frank Martin, M.D.
Baltimore

The literature of ulcer of the stomach and duodenum has become so numerous as to make it impossible in a paper of this character to do credit in the slightest way to the subject. There is no surgical condition, however, that presents a greater array or a more varied picture of pathological lesions, some time in its history, than does ulcer of the stomach or duodenum; none call forth more important questions to the attention of scientific workers. Indeed, I know of no other subject which presents more vexed problems for solution, and although surgical opinion has crystallized on some, there are many problems still arising in consequence of the varied complications which are as yet very chaotic.

What Does Ulcer Stand For? It stands, I might say, at the gateway of more lines of surgical invasion than all the rest of the pathological lesions of this organ, calling for at least four-fifths of all stomach surgery. The conditions which are directly or indirectly associated with it are pain, hemorrhage, perforation, the secondary results, such as adhesions, cicatrices, contractions, and obstruction, and above all, that nightmare or dread disease which selects this site more commonly than all others of the entire alimentary canal for its development, namely, carcinoma

at the site of the ulcer, and finally the systemic conditions, toxemia, lowered vitality, anemia, etc. *These are a few conditions of what it stands for.*

Abundant clinical and pathological investigations have gone on in order to solve these problems, and to place the treatment on a better basis, but still there is that wide diversity of opinion which keeps the subject decidedly unsettled. Attacking this subject a few years ago, it would have been a relatively simple task. Today it is far different, and by no means easily performed, and the last word certainly has not yet been said.

Twenty years ago was an epoch-making period in the history of stomach surgery, and it was then that I assisted my chief, Dr. L. McLane Tiffany, in doing the first gastro-enterostomy ever done in Baltimore. The von Hacker posterior gastro-enterostomy was done for an obstruction of the pylorus, due to a malignant disease having been engrafted on an ulcer at that point. The patient made a nice recovery, and was relieved of the starvation symptoms produced by the obstruction, and experienced comfort for a considerable time. Two years following, however, he died from the progress of his cancer. That case, as I look back upon it, was an ideal case for resection, for the progress of the growth had made only slight headway, but the operation that was done was a side-tracking operation and an operation for drainage, and I cite this case because that has been the operation that has had full sway practically as a cure-all for gastric and duodenal ulcer with its varied complications. Since then they have become so numerous that they now rank by the thousands.

During the last twenty years, much advanced work and great strides have been made, improvements accomplished in the technique of the varied operations, and many new operative procedures introduced, but during this time one of the chief advances, made by the surgeon and surgical invasions into this field, has been to shed light and actually

clear up many mooted pathological problems, hitherto unrecognized. One, for instance, has been the recognition of the greater frequency of duodenal ulcers, which were formerly thought always to be gastric, now shown to constitute three-fifths of the cases. In the beginning there was very little exact knowledge of the pathology of ulcer except its complications, and in my experience stomach analyses have aided very little in reaching an exact diagnosis. In my earlier cases it frequently indicated malignancy where benign conditions were found, and often just the reverse in inoperable malignant cases.

Location. The location of duodenal ulcer is in the first inch and a half of the duodenum, extending up to within three-fourths of an inch of the pylorus, some of them involving the margin of the stomach at the pyloric ring. Being rather high, and involving the pylorus, probably explains why they were classified as gastric ulcers. Gastric ulcers are usually single, solitary in 87 per cent.[1]

When multiple ulcers exist they may be only two in number or almost uncountable, and 90 per cent. occur in the grinding pyloric end of the stomach, more often near the lesser curvature, often projecting down upon the anterior and posterior walls, and therefore called "saddle ulcer." An excellent illustration of such a type of ulcer is shown in Fig. 1, which represents case eleven in my series of acute perforation cases. It was a case of long-standing ulceration of the stomach, which had extended down on the anterior and posterior wall of the stomach for a considerable distance. At this *ulcer-bearing area carcinoma had developed.* The perforation had occurred on the gastric side of the saddle, at the thinnest portion of the ulcer. He was brought to me fifteen or sixteen hours after the first symptoms, from the medical side, where the perforation had occurred, and I operated on him for acute general peritonitis, resulting from this perforation. I found it impossible to close the perforation on account of the marked thickening which

had occurred in and around it from the carcinomatous infiltration. This infiltration had extended, not only in the stomach wall in and about the ulcer-bearing area, but had metastasized into the lymphatic structures, and there was a huge mass fastening it to the back so that it was utterly impossible to get it up and resect it. I could not begin to get around it; the opening where the perforation occurred was so densely infiltrated and thick that I could not close the perforation as it was, but I found by dissecting the perforation out, by making an incision around it as is indicated by the dotted lines at *P* in Fig. 1, which made quite a good-sized opening into the stomach, and by putting in mattress sutures, I could bring together this opening and turn it in. The abdomen was then opened below and drainage applied both in the lower abdomen and upper abdomen. The patient made an uninterrupted recovery and improved considerably for a number of months, but died from the ultimate progress of the carcinoma. I mention this case largely from the fact that it is not common to meet with a perforating gastric ulcer after carcinomatous infiltration has taken place in it, and it is the first one of the kind I have had in my experience.

A gastric ulcer usually stops abruptly at the pylorus. Both gastric and duodenal being nearer the pylorus, interfere with the motility and give rise to mechanical difficulties in the process of healing, and likewise cause obstruction and retention of food. Haggard[2] says, "The portion of duodenum involved by the ulcer is the portion which acts as a vestibule, as it were, for the small intestine, and is a meeting ground for the acid stomach ingesta and the alkaline biliary and pancreatic secretion, so that it partakes of the character of the stomach and its ills, and is supposed to be more frequently diseased than any other part of the intestine of equal length, save the rectum."

Duodenal ulcers are more serious from the fact that their coats are much thinner and the danger of erosion of large

bloodvessels and perforation of the ulcer much greater. However, they are less serious in that they seldom take on malignant degeneration. Two of my late cases of pylorectomies for duodenal ulcer are exceptions to that rule, however, as it was shown that malignant degeneration had taken place in the ulcer. Hemorrhage occurs from ulcer at this site more commonly; it is noted in about one-half of the cases. Primary hemorrhage, although severe, seldom calls for operative interference. A question, to my mind of much clinical importance, and about which much stress is laid, is clinching the diagnosis of ulcer of the stomach and duodenum on the finding of occult blood. This, of course, is of considerable value when associated with the other clinical evidence, but its absence in no way negatives the diagnosis of ulcer. If the diagnosis is to be clinched on this finding, then many cases will go totally undiagnosticated. As Mayo says, "Occult blood in the stool affords considerable evidence as to the fact that it is blood, but it should never be lost sight of that it bears with it no indication as to its source. It may come from any slight abrasion in some part of the many feet of mucous membrane which exist between the lips and the anus." As a matter of fact, hemorrhage from these chronic ulcers is by no means of frequent occurrence, and I, for one, do not lay stress on its absence as contra-indicating the diagnosis.

Recurring, acute, hemorrhages are best treated by opening up the stomach or duodenum, locating the bleeding point, and suturing the part firmly. Chronic, small hemorrhages, on the contrary, can be cared for by gastrojejunostomy, especially if the ulcer is limited to the duodenum or near the pylorus.

The Etiology of Gastric and Duodenal Ulcers. The gastric and duodenal ulcers have practically the same etiology. Being still a speculative and unsettled point, I will not go into it, but I cannot pass over this subject of the pathogenesis of gastric ulcer without calling attention

to the article of Turck[3] on "Ulcer of the Stomach, Pathogenesis and Pathology." He lays great stress on the role that cytolysis and autocytolysis play in the formation and the persistence of ulcer. The chief factors of most scientific investigations are *injury of the mucosa in the grinding pyloric end, anemia, and hyperchlorhydria.* Mayo[4] states, "Ninety per cent. of gastric ulcers are to be found in the pyloric end, which contains one-sixth of the gastric mucosa, while the beginning of most duodenal ulcers will be detected at the point of impact, where the acid chyme is forcibly ejected through the pylorus against the duodenal wall."

Differential Diagnosis. After all, this is one of the most important points in consideration of this subject, and in spite of the many aids we have at our command, many grievous mistakes are still made. It is important to touch upon the many conditions occurring in this region which have to be eliminated in arriving at a thorough diagnosis. The chief important conditions it has to be differentiated from are gall-stones, cancer, and chronic appendicitis. I am sorry time will not admit of this very important subject of diagnosis being gone into.

Usually the clinical history of the majority of gall-stone cases admits of an easy diagnosis. The chief things are that the symptoms appear in these gall-stone cases in well-defined, decided attacks of short duration, and which after subsidence, there is an intermission of days, months, or years, frequently, of perfect health, except in the uncomplicated cases. The attacks come suddenly, without warning, and there is an abrupt cessation, which is as sudden as the onset.

In cancer the history is a progressive one of gradual emaciation, pain is quite constant; although it may be less acute than in ulcer and more continuous; a dull, depressing ache, as it were, usually intensified by ingested material, usually located in the epigastric region; the gas distention is more chronic and depressing; the appetite is lessened and

there is usually a disgust for food; emaciation is, as a rule, rapid, and the patient rapidly takes on languor, which is continuous.

The chief symptoms, usually in a clinical history, will eliminate chronic appendicitis as the exciting cause.

There is a defined, typical syndrome of symptoms of chronic gastric and duodenal ulcers which is quite pathognomonic. These are the symptoms of indigestion, associated with hunger, sour feeling in the stomach, pain, gas retention, sour vomiting, with or without blood; and the pain recurring two to four hours, pretty regularly, after meals. Anything that neutralizes the acid as a rule gives temporary comfort. Ulcers distal to the pylorus, namely, in the duodenum, give rise to symptoms that, as a rule, vary in degree, and in most cases are perfectly clear, and admit of an unhesitating diagnosis. Sometimes they exist without any symptoms until a sudden, and perhaps fatal, hemorrhage or perforation declares its existence. The pain in a measure differs from that of stomach ulcer; it is produced from irritation of the open ulcer by the hyperacid gastric juice, and comes on after the stomach digestion is complete. In other words, it is more noted just before meals. Coming on just before meals, it is often called "hunger pain," and the patient often finds that something taken will relieve the pain. This is explained by a spasm, produced by the pylorus closing, when there is food in the stomach, and the hyperacid juice no longer gains access to the duodenum. It sometimes occurs significantly in the small hours of morning. It is of a burning character, and located in the right midline or along the costal border. This colicky pain, as said, is caused by pyloric spasm. These patients often do not restrict their food, to any great extent, and there is no appreciable loss of weight in the early stages. As the ulcer continues, however, the pain becomes more constant, the diet is often cut down, the patients are underfed, and emaciation results.

In deference to this subject I quote the words of one of the world's foremost authorities, namely, William J. Mayo.[5]

"The average history of the patient with chronic ulcer upon whom we have operated shows that the disease has existed for years. The periodicity of the attack is as well marked as are the attacks of appendicitis or gall-stone disease, the only difference being that in the early history the exacerbations are to be measured by days and weeks, and the intervals by months and years of comparative freedom. These prolonged periods of relief encourage an erroneous belief as to the curability of the disease. In the course of time the attacks become more frequent, and finally the patient arrives at the stage of mechanical obstruction through stenosis, deformity, or adhesions; or perforation and hemorrhage precipitate an unfortunate ending."

Acute ulcer of the stomach and duodenum properly belong to the domain of internal medicine, and the complications, such as hemorrhage, perforation, and obstruction, are the only ones that claim surgical interference. The *chronic ulcer, the recurrent, bleeding ulcer, the long-standing, callous ulcer,* which entails years of invalidism, and in fully 25 per cent. is the direct cause of death, these more commonly occurring in the form of the "saddle ulcer" of the lesser curvature, even in the opinion of Leube, the most optimistic of medical men, should not be held under medical supervision longer than four weeks, and then are to be considered surgical. They usually show little tendency to heal under medicinal and dietetic treatment, and when they seem to do so the cure is usually not lasting, and the best statistics indicate that they recur or relapse in at least two-thirds of the cases which are apparently cured, to say nothing of the sequelæ and complications which may follow. The statistics of 500 cases treated at the London Hospital, show that about 50 per cent. were uncured by medical means, and of those discharged as cured, one-half relapsed. The results secured

at the Massachusetts General Hospital were entirely in accord with those of the London Hospital.

Rodman[6] states if we exclude acute ulcer, which we admit tends to heal spontaneously, as a rule, it will be found that the mortality under the medical treatment of chronic ulcer is perhaps actually greater than 50 per cent., so that it would seem that the profession is apt to underestimate the great mortality of gastric ulcers.

It is no longer now a question whether to operate in such cases, but how? In answer to this question I might say that gastrojejunostomy was for a long time considered the operation of choice in both gastric and duodenal ulcers. It was based on a common sense and mechanical principle, of both giving rest to the diseased part by diverting the food and gastric secretions to a new outlet, which should be on the storage side of the stomach, at its lowest point under the cardiac orifice. The "no loop" posterior gastrojejunostomy was conceded to be the best procedure. This certainly accomplished the work and proved curative in many of the duodenal ulcers.

In the earlier period the surgery of chronic, gastric, and duodenal ulcers was surgery for benign obstruction, and two varieties of operation that were employed were gastrojejunostomy and pyloroplasty of Heinecke-Mickulicz. These were looked upon as cure-alls, and applied indiscriminately, without regard to local conditions, and it was learned from experience that in cases where there was a positive and definite obstruction there was almost certain relief, and a cure, with marked improvement immediately following. Many such cases I can call to mind. The patients were all invalidized by pain, and emaciated from underfeeding, up to a point of almost starvation. These were most promising, and the patients took on full vigor and health, and remained permanently well. This same operation soon became the cure-all operation for all stomach maladies, regardless of the true condition present, and was resorted to even where

the gross obstruction lesions were not present, and it was made use of in an attempt to forestall these progressive symptoms of starvation from obstruction, and thus to terminate the disability. The reasoning here was faulty, and the results from the operation were even more so, did not compare favorably with the earlier ones, in which the problem was purely one of mechanics, and many cases were made worse rather than better; and as the gastric contents passed out from the stomach as much through the pyloric opening as through the gastro-enterostomy opening, the causes for the ulcer were again exerting their influence to retard the healing process.

Surgery is offering ever new incentives. The question which is preëminent and of most interest to the surgical world at present, is as to the *ultimate* result in these ulcer cases, not so much as to the immediate results. Stomach surgery is still young, and the statistics bearing upon this one point are not sufficiently great to be entirely conclusive. It would be interesting to know how many of the numerous so-called "cures" following a gastro-enterostomy for gastric and duodenal ulcer remain permanently cured, and how many will ultimately develop carcinoma later on at the site of the supposed healed ulcer. This to me is a subject of great importance.

What has impressed me more forcibly of late pertaining to this particular phase of the subject is that in 2 out of the last 3 cases operated upon by me (pylorectomy), the microscopic findings were beginning malignancy. In one of these cases (Fig. 2) the clinical manifestations were totally insufficient to recognize it as beginning carcinoma. In other words, there was no induration, no thickening of moment, nothing to excite one's apprehension from the clinical standpoint that the ulcer was other than a simple, inflammatory ulcer, and yet the microscopic findings were those of beginning malignancy.

On account of the interest of these 2 cases I wish briefly

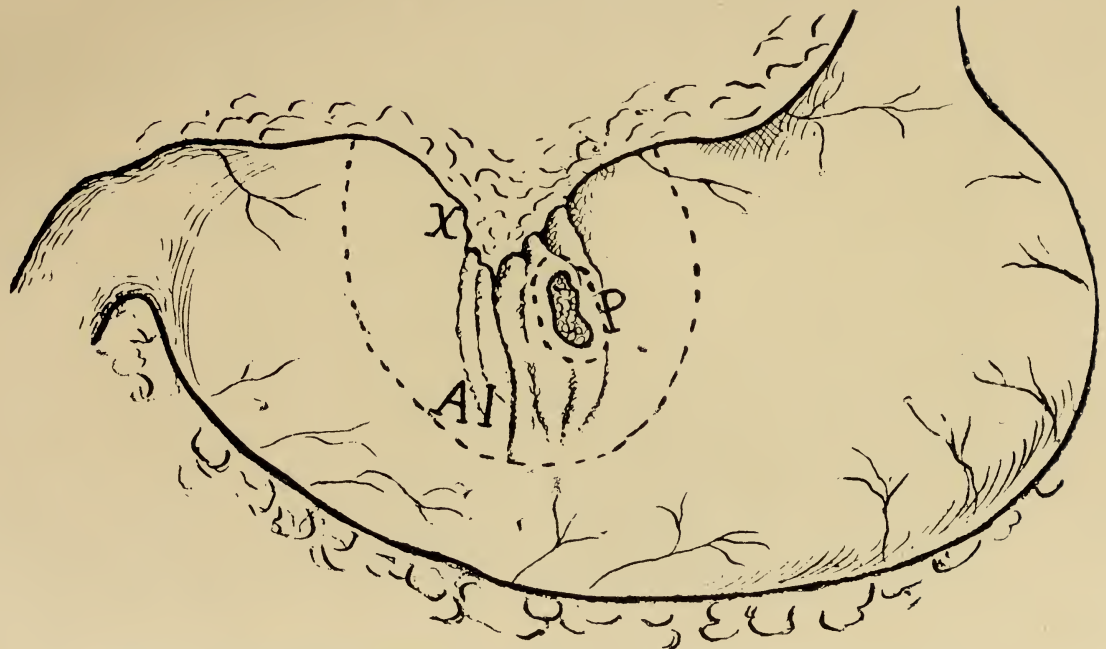


FIG. 1.—*A I*, area of infiltration; *P*, perforation; *X*, saddle ulcer with constriction.

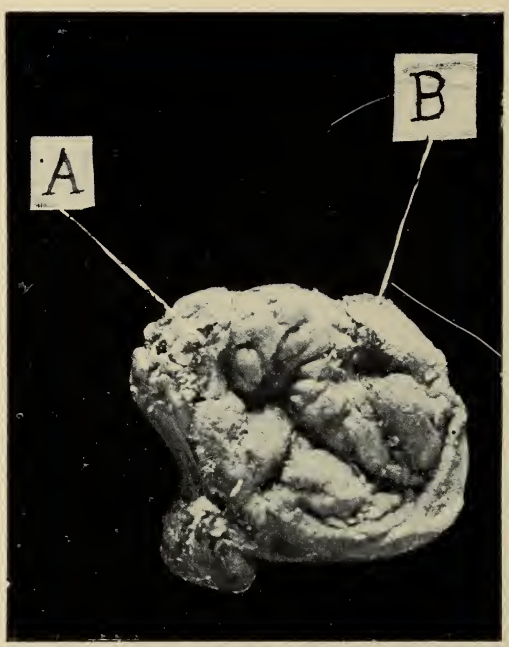


Fig. 2.—Photograph of ulcer removed from Mr. J. K., June 28, 1912. "A" indicates the ulcer and "B" the point where it was about to perforate. The specimen is the section of pylorus with ulcer shown on duodenal end of pylorus, about three-quarters of an inch from the pylorus. The pylorus has been cut through and laid out so as to reveal the point of perforation as is shown at "A." The microscopic report showed beginning malignancy.

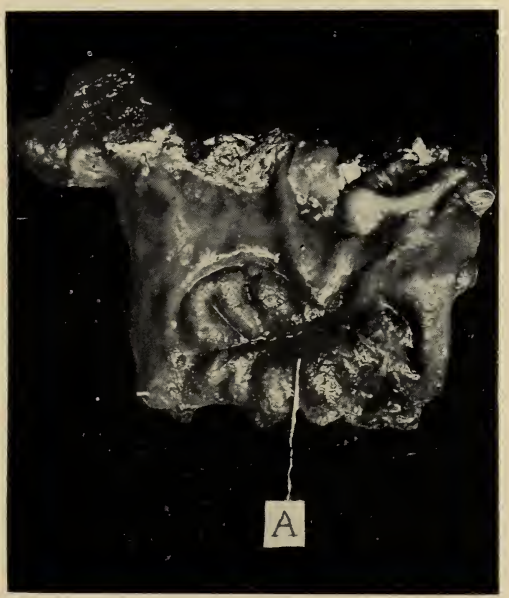


Fig. 3.—Photograph of ulcer taken from Mrs. P., October 12, 1912. Point of instrument shows the bed of ulcer and the immediate area around the infiltration extending off from this. The specimen is the section of pylorus with ulcer shown on duodenal end of pylorus, about three-quarters of an inch from pylorus. The pylorus has been cut through and laid out so as to reveal the ulcer, as is shown by the point of the arrow.

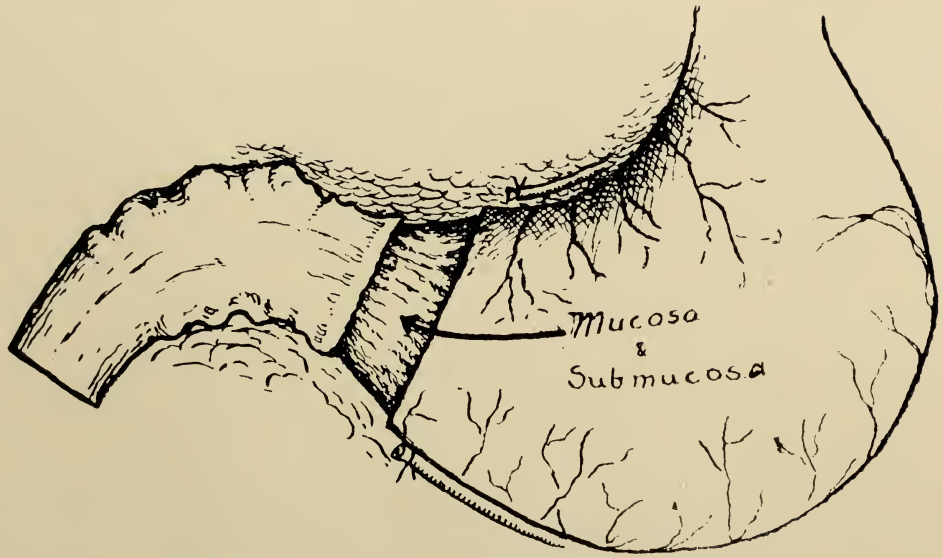


Fig. 4.—Muscular and peritoneal coats stripped back.

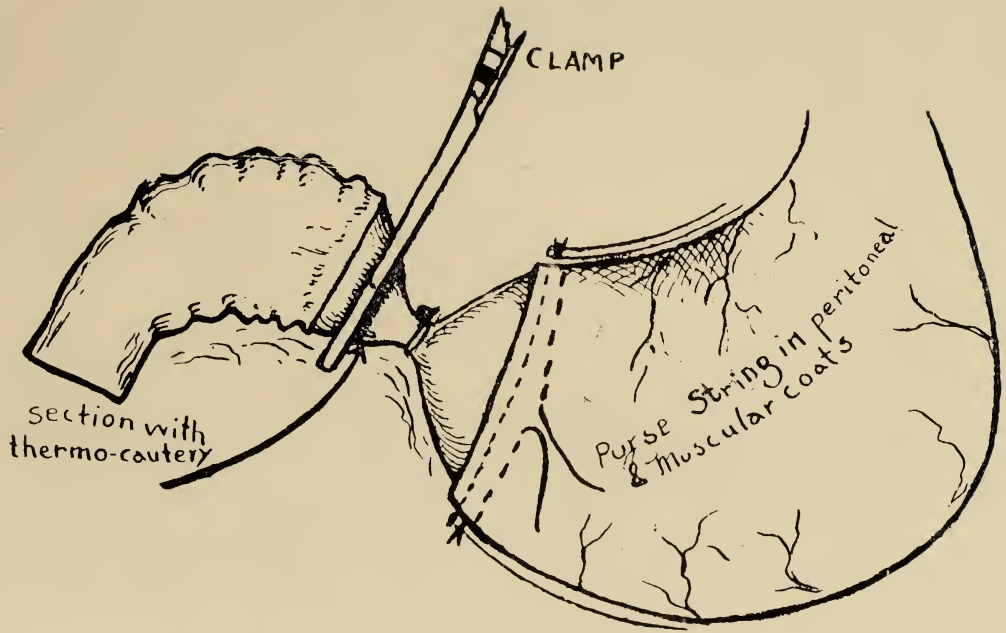


FIG. 5.—Mucosa and submucosa crushed and ligated with catgut preparatory to amputation of pylorus with cautery.

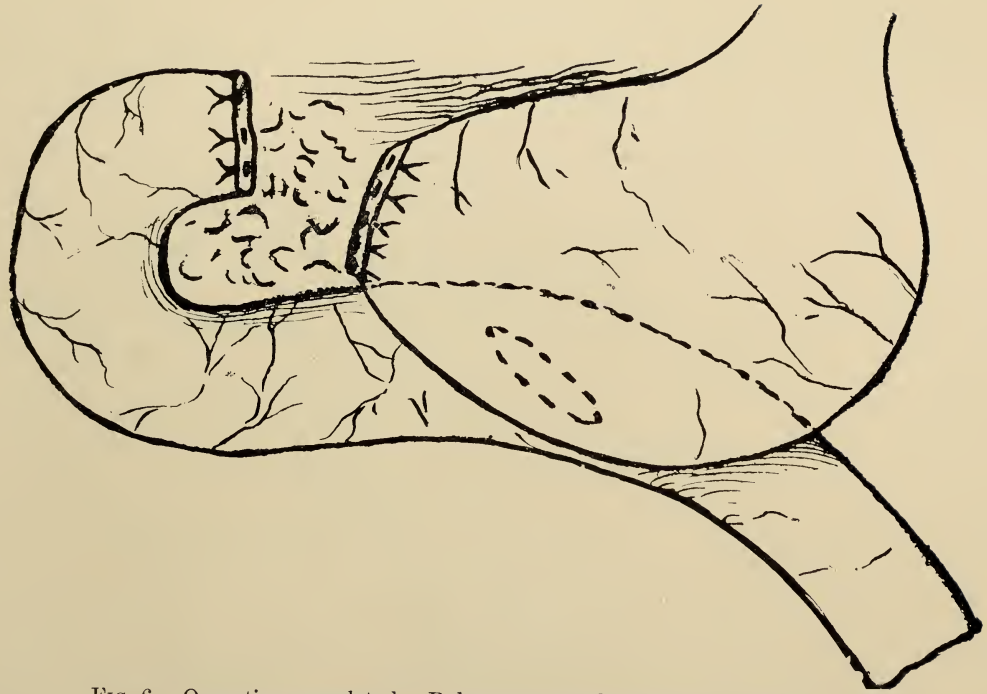
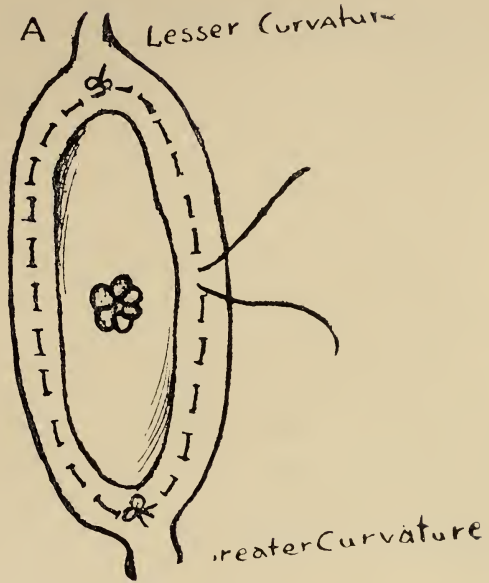
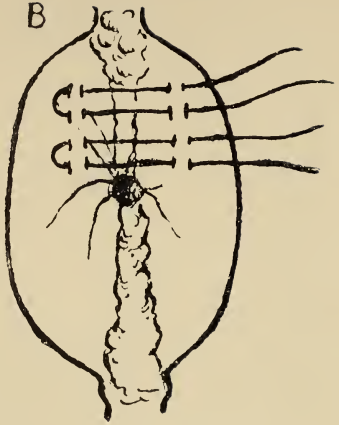


FIG. 6.—Operation completed. Pylorectomy and posterior gastrojejunostomy.

FIG. 7



Purse-string suture of heavy silk in muscular and peritoneal coats inverting the stump of the mucosa.



Stump covered in with mattress sutures.

to call attention to them, as they illustrate the method I have used, and give the accompanying photographs.

Fig. 2 represents ulcer removed on June 28, 1912, and shows the pylorus cut open and the ulcer, which was nearly perforated, exposed. The history is:

J. K., aged forty-three years; turned over to me by Dr. Carroll with diagnosis of duodenal ulcer, having had symptoms since February, 1911. He arrived at his diagnosis by the use of Einhorn's duodenal content aspirating apparatus, and the patient was turned over to me for operation.

Operation. The operation was done June 28, 1912. A small ulcer was found in the duodenum just beyond the pylorus. Although there was no clinical evidence of malignancy, I did a pylorectomy and made use of the method I have later called attention to, of closing the stomach section. The examination of the resected area showed a small, circular, punched-out ulcer which had penetrated through until the peritoneal coat was reached. The patient made an uninterrupted recovery and returned in August weighing 129 pounds, and on September 7 his weight was 143 pounds. He has returned to work, has entirely recovered, and looks a perfect picture of health. In this case the microscopic report sent in from the laboratory was *beginning malignancy.*

In the next case (Fig. 3) operation revealed a duodenal ulcer situated about three-fourths of an inch from the pylorus. The history is:

Mrs. P., aged thirty-two years; for the last twelve years she has had digestive disturbances and suffered great pain in the region of her stomach, and was brought to me for a gall-bladder case.

Operation. At operation a well-marked duodenal ulcer, about three-fourths of an inch distal to the pylorus was found; considerable thickening going off from the ulcer; the infiltration extended off and there was a suspicious hard feel in this infiltrated area which made me feel that possibly

malignant changes would develop in this case. *A complete pylorectomy* was done, and the same method of operation resorted to. She made an uninterrupted recovery. The report from the microscopic examination showed evidence simply of inflammation without malignant changes. The date of the operation was October 12, 1912, and a report from her on December 3 states that she is entirely relieved from pain and soreness, and has no stomach disturbances whatever; likewise, a letter from her doctor that same date states that she is a perfectly well woman.

I will pass over the consideration of the other important complications, such as hemorrhage, perforation, etc., and consider for the moment the possibility of that late complication, namely, the oncoming carcinoma which is so commonly engrafted on the seat of these old ulcers. I have just recently published a number of perforation cases under the title of "Acute Perforation of Gastric and Duodenal Ulcers," and consequently will not go over that subject here.

As to Late Complication, Carcinoma. *If it is true, as the statistics show us,* that in 70 per cent. of these cases malignant disease has formed at the base of the ulcer, then if we ever hope to attack this forlorn picture of cancer of the stomach with any prospect of relief, we must attack it in its precancerous stage, and it has been definitely shown by all operators that the precancerous history of cancer of the stomach is that of ulcer, chronic ulcer, and proof of this fact is obvious, and it behooves us to recognize this condition before *bleeding, perforation, obstruction, or cancerous degeneration* becomes manifest. Great inroads are made when the cancer attacks this latent ulcer.

Mayo[7] states, "But what has better strengthened our position that ulcer is the great and fertile soil of cancer, has been the pathological findings during the past four or five years. However satisfactory a long history may be, we have demonstrated that it is not necessary in order to establish

the fact that ulcer precedes cancer. Indeed, some of our shortest histories have proved to be those where cancer has been implanted on the non-malignant ulcer base."

A case I saw in the clinic of my colleague a few years ago is so illustrative as exemplifying the importance of this point, that I cite it here:

The case was being operated on for pain in the upper abdomen, with symptoms pointing toward gastric ulcer near the pylorus, and there was so little evidence of thickening or obstruction at the pylorus that I did not urge a radical operation. There was, doubtless, in this case a definite ulcer which was just beginning, and was overlooked by both the operator and myself. It was left, the patient recovered from the operation, and returned in less than a year with an inoperable cancer at this point. Now, at the time I examined it there was no evidence of cancer there whatever, and the thickening was so slight that I did not think it warranted, in my opinion, a resection.

Rodman,[8] in 1906, states that if the ulcer or ulcers are situated near the pylorus, as they will be in 90 *per cent.* of all cases, pylorectomy or excision of the ulcer-bearing area should undoubtedly be given the preference. This seems rational from the fact that ulcer and cancer occur practically in the same area. Each occur at the pylorus in 90 per cent. of all cases. The conclusion is almost an irresistible one. That malignant tendency must be far more common than hitherto suspected. *One-third of all carcinomas* occur in the human stomach, and the fact that constant irritation is known to be a potent factor in transferring benign into malignant ulceration, which fact is present at all times in this organ.

The trend of opinion during the past year, frequently outspoken by authors, both here and abroad, tends to show the great tendency of callous gastric ulcers to carcinomatous change. In Germany and France[9] the trend of opinion likewise is developed in this direction, so that if we are to trust

for improvement in the future, the rational solution of the ulcer-bearing area would indicate the excision, if possible, by pylorectomy or gastrectomy, or if located in other portions of the stomach, excision of the ulcer is indicated. What could be more forlorn than the present cancer problem of the stomach? Every day we are opening abdomens simply to close them again, where an inoperable carcinoma of the stomach is shown to exist.

Tuffier[10] concludes that every gastric ulcer which is solitary, and which is easily accessible, should be extirpated. Many surgeons have emphasized the impossibility of distinguishing malignant from inflamed tumors of the stomach by gross examination. The general trend of opinion seems to be leading to this: That gastric ulcer situated in the body of the stomach, but not yet causing stenosis, is not cured by gastro-enterostomy. Resection, when possible, should be done, not only because the ulcer is not cured by gastro-enterostomy, but mainly because its continued existence is a constant menace as regards the probability of a change to carcinoma.

So it would seem that our only hope is to keep constantly before us the predisposing conditions which are becoming more and more clearly outlined, and adopt radical lines of treatment by attacking the disease in its precancerous state; namely, in the ulcer or non-malignant state, and thus head off through prevention this frightful and dreadful picture of carcinoma of the stomach, which, when brought to the surgeon, is so commonly found to be inoperable. In other words, our only chance of fighting cancer of the stomach is to attempt to cure, not the cancer, but the stage immediately preceding it; namely, ulcer.

Mortality. The mortality of even the more complicated operations does not exceed 3 per cent., while the cures will, I believe, run 95 per cent., or over.

Unfortunately, on account of the false conception, the improper knowledge of the findings, of the mistakes in

diagnosis, the absence of the ulcer in many cases for which blundering surgery has been done, the performance of many so-called cure-all gastro-enterostomies which had not been indicated and were totally unwarranted, consequently, many failures as to cure resulted, and an immeasurable amount of discredit brought on stomach surgery. So is there any reason then that there exists such a wide diversity of opinion between internists and surgeons?

Operations of Choice. The operations of choice here, it seems to me, should be about as follows:

Gastro-enterostomy is still a most valuable operation in cases of benign stenosis, with obstruction resulting from healed ulcers.

When the ulcer is away from the pylorus, either as a "saddle ulcer" on the lesser curvature or in the body of the stomach, resection of the ulcer and ulcer-bearing area is indicated.

For chronic ulcers in the pyloric arm of the stomach, near the pylorus, and duodenal ulcers, the operation of Rodman; namely, *pylorectomy*, is in my judgment the operation of choice.

I fully appreciate that since the very valuable contribution to this subject of gastric and duodenal ulcers, as given by Dr. Robert F. Weir in 1900, which cited only a small number of cases, which were dealing principally with acute perforations, the articles pertaining to this subject have been so numerous that it has almost worn threadbare, and my chief excuse in presenting this paper is to call attention to a method of procedure which I have recently adopted in the last few cases, which seems to be in a measure different in some of its details from any that I have personally seen, so that as it has answered very satisfactorily in my hands, I call attention briefly to it here.

Operation. The method of procedure that I have been using in the last few cases I will briefly describe, the essential difference from the ordinary procedures adopted being the

way in which the *stomach section is closed.* It has proved most satisfactory in my hands, and I herewith briefly describe it:

The pylorus is gotten up, freed thoroughly, traction made upon it as it is freed from the surrounding parts; then all the bloodvessels are tied off from the lesser curvature and the greater, and from the duodenal side as far back as the line for the sectioning is indicated. In other words, the bloodvessels are completely secured at the *sectioning line.* This is done so that there will be no fear of hemorrhage when ligating. After this is completed and the pylorus is freed, the line where the section is to be made is determined, and an incision is made completely around on the stomach side, from the lesser to greater and from greater to lesser curvature on the posterior wall. This goes down to the submucosa in the entire circumference. The serous coat and the muscular coat are then stripped back for a certain distance as a cuff, as indicated by Fig. 4, and when the vessels have been thoroughly tied off there is no bleeding, as a rule, from the stomach vessels that remain in the wall.

After this cuff has been turned back, a stout purse-string suture is put in all the way around the entire circumference of the stomach. The submucosa is then crushed so as to lessen the size of this section, as indicated in Fig. 5. This is done by clamping it first anterior-posteriorly and then horizontally, and after a few crushes are made in this way the size of the stomach at this point is reduced so that a catgut ligature is put on at the line of crushing, a clamp is then applied to the pyloric side distal to the ligature, and with the knife of a Paquelin cautery a section is made, as is indicated in Fig. 5. This same procedure is done on the duodenal side, and as soon as the section is made with the cautery, which makes a perfectly aseptic operation thus far, with no leakage whatever, or contamination, the stumps are invaginated and the purse-string sutures tied. Then, with a few Lembert sutures over this, the ends are snugly

brought together, so there is no fear of leakage. This is more or less quickly done, and it completes the pylorectomy. Then a posterior gastro-enterostomy is done, as is indicated in Fig. 6.

Fig. 7 shows the end of the inverted section of the stomach. *A* indicates the suture tied around the submucosa and mucous membrane, and also shows the purse-string suture introduced. *B* shows purse-string suture tied and mattress sutures put in over it to fortify the stump and to bring another layer of serous surfaces together over it.

The advantages that seem to me go with this method of procedure are:

1. The resection is done in a perfectly aseptic manner. There is no contamination, no leakage, and up to this point there has been complete absence of any soiling whatever.

2. It is done more quickly and therefore is time-saving in character.

3. It is done with practically no loss of blood.

4. The chief thing that appeals to me is there is no large, raw, bleeding surface turned into the stomach proper, and in the few cases that I have used it the completion of it has seemed more neat and more thorough than any of the other methods of resection I have ever employed.

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DISCUSSION

Dr. Randolph Winslow, of Baltimore.—I have had an opportunity of seeing this work done by Dr. Martin, and it answers the purpose as he has expressed. There is no soiling and the cases have done well.

REMARKS ON FATAL HEMORRHAGE FROM EROSION OF THE GASTRODUODENAL ARTERY BY DUODENAL ULCERS

By James E. Thompson, M.B., B.S. (Lond.), F.R.C.S. (Eng.)
Galveston, Texas

It has been my misfortune to have witnessed two fatal cases of bleeding from duodenal ulcers in spite of the operation of gastro-enterostomy. In both cases the ulcer was situated on the posterior surface of the first portion of the duodenum and in both the hemorrhage, which proved fatal, came on at a time when it looked as if the patients would recover from the operation.

The first case died thirty-four hours after the operation, with all symptoms of concealed hemorrhage, but as no autopsy was allowed, we can only surmise from the position of the ulcer that the gastroduodenal vessel was eroded. For this reason I have appended brief notes only.

Case I. R. A., male, aged twenty-eight years, white. He had suffered from symptoms of dyspepsia for over three years, characterized by epigastric pain appearing usually about two hours after meals, acid eructations, and the occasional appearance of blood in the stools. During the six months prior to operation he had suffered from several fainting spells which had been followed by the passage of stools containing much blood. Three weeks before he came under observation an alarming hemorrhage had occurred, from which the patient had not entirely recovered. He was so weak and anemic that he was confined to bed. Every stool was tarry.

Operation was performed on June 9, 1905. The stomach showed no evidence of ulceration. A thickened ulcerated area was felt in the posterior wall of the first portion of the duodenum. A posterior gastro-enterostomy was performed. The patient rallied from the operation poorly. Early next day he was a little better, but toward evening he became restless and faint. He grew gradually weaker and died at the end of thirty-four hours with all symptoms of internal hemorrhage.

Case II. H. N. A., aged thirty-five years, male, white. Family history and history of childhood of no interest.

Present Illness. In April, 1899, he began to suffer from pains in his stomach which came and went without apparent connection with eating. They were relieved in a few minutes by bicarbonate of soda. No loss of weight or diarrhea was noticed. The pains occurred at unequal intervals and disappeared entirely at the end of two months.

In the fall of 1903 the same symptoms reappeared and were accompanied by vomiting. At first the vomited matter consisted of partially digested food only, but at the end of a month it was frequently dark or coffee-colored. At the end of three months the symptoms disappeared entirely. No notice was taken of the stools. In June, 1910, the pains returned again, and were relieved by bicarbonate of soda.

In September he consulted some very good men in Chicago, and they found nothing wrong. In October of the same year he passed segments of a tapeworm and continued to pass them until November, when a vermifuge removed the worm. About the middle of November the pain reappeared. It was accompanied with gas and vomiting soon after meals. There was gradual loss of weight. About Christmas the worms reappeared in the stools and have been present ever since. From this time the stomach symptoms have continued without cessation up to the present. The pain comes on usually within an hour after meals and is intense for two or three hours, when it subsides somewhat.

It never entirely disappears, however, and interferes with sleeping so much that he only rests, on an average, three or four hours each night. There are always intensely acid eructations, and frequently vomiting of stomach contents. There has been marked constipation and a loss of weight of 44 pounds during the last four months.

On March 18, while undergoing a physical examination, he was handled rather roughly. On March 19 a test-meal was taken, and on account of the failure to pass a stomach-tube an injection of gr. $\frac{1}{50}$ of apomorphine was given. About twenty minutes afterward, after the effects of the apomorphine had passed away, while sitting in a chair, laughing and talking, he fainted without any warning. The condition appeared to be relieved promptly by the injection of strychnine. In a few hours the bowels moved and the stool was saturated with blood. The same conditions were noticed on March 20 and 21. On March 22 he came under the care of my colleague, Dr. Graves. He was then suffering from the effects of severe hemorrhage. He was very blanched. A blood examination showed: Red cells, 3,760,000; white cells, 7800; hemoglobin, 75 per cent. The urine showed nothing abnormal. An examination of the stools showed blood present and segments of Tænia saginata. On March 24 a rectal examination was made, but nothing abnormal found. A diagnosis of duodenal ulcer was made and operation suggested, but positively declined.

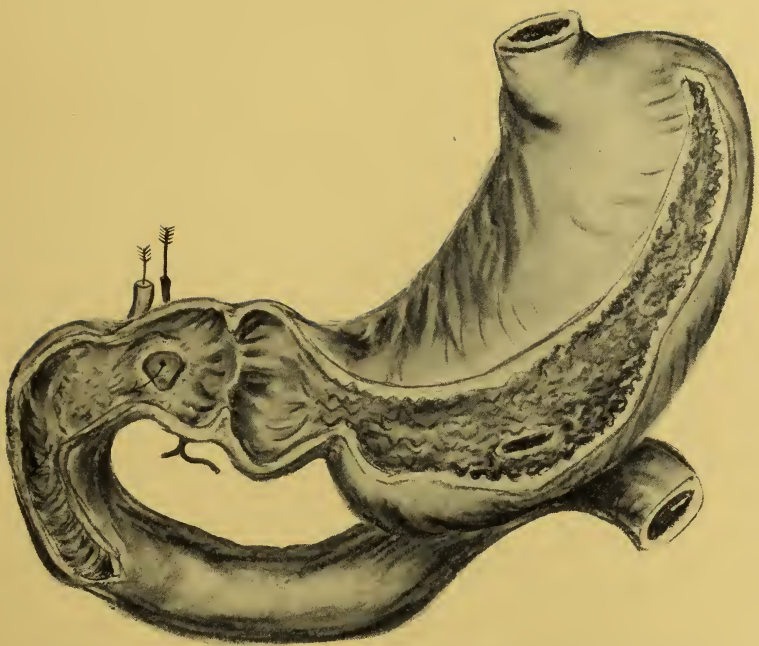
On March 25, in the afternoon, the patient became faint, was covered with cold sweat, and showed signs of severe internal hemorrhage. I saw him on March 26, and although he had recovered somewhat, his condition was still desperate. During the day he improved somewhat, and on March 27 he consented to the operation. At 2.30 P.M. the operation was performed. The stomach was large, flabby, and anemic. The first part of the duodenum at first appeared healthy, but on palpation a large indurated area was felt occupying

its posterior wall and the adjacent part of the pancreas. The coils of jejunum were distended with blood. A gastroenterostomy was performed, but the duodenum was not folded in.

The patient endured the operation fairly well and was carried to bed in fair condition. After the operation the patient continued to improve steadily. His condition when I saw him late at night on March 28 was excellent. At 7 A.M. on the morning of March 29, he showed signs of a return of the hemorrhage. In half an hour he was almost pulseless and he died a most tragic death, as we were preparing to transfuse him directly from the radial artery of his wife. He lived forty-two hours after the operation.

I conducted the postmortem examination personally within an hour of his death. The stomach, pancreas, and duodenum were removed *en masse*. The stomach, duodenum, and the whole length of intestinal canal were full of blood. On slitting up the duodenum an ulcer 17 mm. long and 17 mm. broad was found occupying its posterior wall. It was situated almost midway between the pyloric ring and the bile papilla. The edges were rolled out and indurated. At the bottom of the ulcer a small aperture was seen. A probe passed into it travelled easily in either direction, upward or downward. A search was made for the gastroduodenal artery. After tedious dissection, through dense inflamed tissue it was found. A stream of water was passed downward along it and it escaped almost at full bore through the opening in the base of the ulcer. A similar stream was forced upward along the right gastroepiploic artery with the same result.

Bleeding from duodenal ulcers may vary to any extent both as to quantity and periodicity. It is probable that most duodenal ulcers bleed periodically and that the slighter hemorrhages are overlooked, only the more massive ones being recognized. When careful examinations of the stools are made systematically, occult blood is found in a very large pro-



Specimen removed post mortem from Case II, showing duodenal ulcer, with eroded gastroduodenal artery in its base.

portion of cases, for it is a matter of daily observation that patients do not recognize coffee-ground vomit and tarry stools as positive signs of hemorrhage. Ocular manifestation of bleeding is usually registered as "hematemesis" or "melena," and in taking the history of a patient we have usually to rely on their conception of hemorrhage. From a clinical standpoint we may divide the bleeding into two varieties: (1) *Chronic hemorrhage*, in which the blood is lost slowly, and usually in a moderate quantity; and (2) *acute hemorrhage*, often profuse and so abundant as to endanger the patient's life. Either variety of hemorrhage may show periodicity, but the chronic form is more likely to be constant than the acute.

FREQUENCY OF HEMORRHAGE

It is interesting to note the frequency and variety of bleeding. In Moynihan's first series of cases he noticed that 71 patients (38 per cent.) gave a history of bleeding at one time or another; of these, 17 had hematemesis alone, 24 had melena alone, and 30 had both hematemesis and melena. In his second series of cases (101) hemorrhage occurred in 49 (almost 50 per cent.); of these, 9 suffered from hematemesis alone, 10 from melena only, and in 21 both hematemesis and melena had been observed.

The figures of the older writers were not based on such close clinical observation, but dealt with severe hemorrhage only. Perry and Shaw estimated that 13 per cent. of the bleeding cases end fatally.

SOURCE OF HEMORRHAGE

There is not sufficient evidence either of a clinical or pathological nature to enable us to state accurately the source of hemorrhage even in cases where bleeding has been a prominent symptom. All of Moynihan's cases recovered,

so of course no pathological proof is possible. He noticed unusually severe hemorrhage in five cases (Nos. 14, 19, 28, 43, and 138). In three of them the position of the ulcer is stated as being on the posterior wall; in the remaining two the infiltration of the duodenum by inflammatory products was so massive that its exact position could not be determined. The statement is probably true that ulcers occupying the anterior wall rarely cause severe hemorrhage, whereas those on the posterior surface are extremely likely to erode important vessels such as the hepatic and gastroduodenal arteries. Still it must not be forgotten that in the duodenum, as in the stomach, superficial insignificant ulcers may bleed profusely. Thus Quénu reported a case of extreme anemia due to hematemesis, where at operation a small ulcer was found occupying the anterior wall of the first part of the duodenum. Bleeding ceased after obliteration of the pylorus, followed by gastro-enterostomy. Also Moynihan reports a case (No. 114) where operation was performed on a patient who had suffered from a severe hemorrhage followed by profuse melena, in which he excised a small round ulcer on the anterior wall of the duodenum, and sutured a precisely similar ulcer on the posterior wall. In the cases collected by Collin, where the source of the fatal hemorrhage was determined by a postmortem examination, the vessels affected were as follows:

	Times.
Arteria pancreatico-duodenalis	12
Arteria gastro-epiploica dextra	2
Arteria pancreatico-duodenalis superior	3
Arteria abdominalis	2
Vena portæ	2
Arteria hepatica	1
Arteria mesenterica superior	1

It would appear then that the gastroduodenal artery is more likely to be opened than any other vessel, and this we should expect from the anatomical relationship of this

vessel to the first part of the duodenum. Deep eroding ulcers occupying the posterior wall are sure to extend to this vessel sooner or later, and if thrombosis fails to precede the erosion, severe hemorrhage is inevitable.

TREATMENT

It is proved beyond doubt that in the majority of cases of duodenal ulcer associated with hemorrhage, gastroenterostomy will check the bleeding. This is shown conclusively in Moynihan's series of cases of severe hemorrhage, eighteen in number, where the operation was unattended by any mortality. Of course there is no definite proof that such a large vessel as the gastroduodenal artery was bleeding in any of his cases, but the severe symptoms in three of them where the ulcer occupied the posterior wall (Nos. 14, 28, and 138) point strongly to such a condition. I have found one clinical observation noticed by Mayo Robson that proves conclusively that the rest imposed on the duodenum following the anastomosis favors closure of the artery by a clot. A patient upon whom a gastroenterostomy had been performed for bleeding supposed to be from a gastric ulcer died at the end of ten days for perforation at the site of anastomosis. The postmortem examination revealed no evidence of a gastric ulcer, but a large deep duodenal ulcer, at the bottom of which lay the gastroduodenal artery with an ulcerated hole in its side, completely closed by a firm thrombus.

The essential principle involved in this method of treatment lies in the enforced rest of the duodenum, which favors clotting at the bleeding points. It is common knowledge that better results follow the operation of anastomosis in cases where the pyloric orifice is obstructed than in those where it is free, and that equally good results can be obtained in the latter cases if the pyloric orifice is obstructed by infolding or is obliterated. Therefore it would be rational

in these cases to obliterate, temporarily at least, the pyloric orifice by massive infolding, so as to prevent any particle of food or fluids passing along the duodenum. In addition to this, infolding of the ulcer is practised if it is situated on the anterior wall, or in case of severe hemorrhage the ulcer might be excised or surrounded with a deep purse-string suture before infolding it. In ulcers of the posterior wall, infolding of the ulcer is not practicable, but it would be feasible to infold the anterior wall so completely that it would form a plug capable of closing the ulcer and blocking up the bleeding vessel mechanically.

I am afraid that in my two cases I allowed the patients to slip through my fingers by trusting too much in the value of gastro-enterostomy alone. It is possible that massive infolding of the anterior wall of the duodenum might have prevented a repetition of the bleeding.

Of course, direct attack of the bleeding point with suture of the vessel would be the most scientific procedure, but it is more than doubtful if it could be done safely. The situation of the ulcer, its depth, immobility, and the dangers of hemorrhage, all would render such an operation unusually hazardous. Personally I was glad enough to get my patients off the table alive after the anastomosis had been completed.

In a letter recently received from Sir Berkeley Moynihan, he outlined the plan of treatment that has been so uniformly successful in his hands.

"I have found that the gastroduodenal artery is rather apt to be opened if the ulcer occupies any portion of the posterior surface, and especially when the ulcer occupies the upper border and posterior surface. I have two ways of meeting the difficulty: (1) If the artery is seen running into the ulcer I pass a needle underneath it and ligature it; and (2) close down the anterior wall of the duodenum by infolding sutures on to the ulcer and make sure of closing the pylorus or the stomach on the near side of the ulcer.

In either case, of course, gastro-enterostomy is done. I feel quite sure that in all cases of duodenal ulcer the local treatment is necessary, in addition to the gastro-enterostomy, for many cases of hemorrhage, after an apparently successful gastro-enterostomy, have been recorded."

My interpretation of this letter is that no attempt is made to open the duodenum but that all the work is accomplished from the outside as outlined. Referring to the possibility of passing a ligature under the gastroduodenal artery before it reaches the ulcer a careful dissection of our specimen showed that it would hardly have been possible. Both the hepatic artery and its gastroduodenal branch were embedded in inflamed tissue of such cartilaginous density that the vessel was dissected with the greatest difficulty.

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DISCUSSION

Dr. Charles E. Caldwell, of Cincinnati.—I wish to report incidentally a case of fatal hemorrhage occurring two years after a successful gastro-enterostomy. The patient had been operated on for duodenal ulcer and returned from the clinic where he was operated on perfectly well, having been for years previous to that unable to eat, or take care of his food at all, and progressively going down in health, was fully restored to health, but unfortunately took to rather dissipated habits again, of drinking more than he should. He drank a great deal of beer. He had a hemorrhage, and when he came under my observation he was completely exsanguinated from the enormous hemorrhage. It is estimated that he must have vomited two quarts of blood. He was practically in a dying condition. Saline injections were given him and everything done to get him in a condition where something might be done, but he passed away. I was anxious to see the source of the hemorrhage, and I made a postmortem examination at 12 o'clock at night, and discovered that the hemorrhage came from the original ulcer. I was unable to determine what artery it was that gave rise to the hemorrhage.

Dr. Gordon K. Dickinson, of Jersey City, N. J.—Not wishing to be at all invidious or aggressive, it seems to me this method of operating is incomplete. From my experience and from my reading and visitations in clinics, there is a close association between ulcers in this part of the tract and lesions existing in the cecum or in that neighborhood. We have found in a series of operations running over four years, watching the cases carefully, that between 75 and 80 per cent. of the duodenal ulcers, gastric ulcers, or lesions in that part of the anatomy are associated with some chronic difficulty in the ileocecal region. In order to cure the case permanently in the sense that we would speak of carcinoma being cured, it is always wise to inspect and operate upon, if necessary, the lesion in the ileocecal region, at the same time you are operating for the terminal condition around the gastroduodenum. We generally find that this is called chronic appendicitis, but I think no surgeon today recognizes chronic appendicitis as being a particular entity. It is always part of a chronic cecitis, which is coexisting with and precedes a chronic appendicitis. We

have two types of appendicitis, namely, an appendix which drains, and the other which does not. The one which drains goes on to a chronic inflammatory condition in connection with the chronic cecal condition. We have adhesions in the neighborhood. Conditions in this neighborhood are sufficient to keep up a reasonable pathology. To avoid recurrent hemorrhage from a healed-over ulcer of the stomach or duodenum, you must have the original lesion rectified.

Dr. F. W. McRae, of Atlanta, Ga.—I was very much interested in Dr. Thompson's cases. I had the privilege, a year ago last summer, of seeing similar cases in Mr. Moynihan's clinic. I did not see Mr. Moynihan operate on a bleeding case. I did, however, have the privilege of seeing Mr. Moynihan's associate, Mr. Collinson, operate in the presence of continuous hemorrhage from pyloric or duodenal ulcers. The anterior wall of the pylorus, or the first portion of the duodenum, by plicating sutures was infolded and jammed back against the posterior wall. Mr. Collison stated that this was the uniform practice in similar cases and had proved most satisfactory.

Dr. Thompson (closing).—My remarks were directed to the question of a serious emergency-hemorrhage, and I feel really guilty that I did not do something more than I did. I was rather hoping some of the members of the Association had met with the same difficulty I did myself, and could suggest some way of getting at the bleeding point, because, it appears to me, if the bleeding point can be attacked safely, it should be done. Personally, however, I did not see any way of getting at it safely.

FAT HERNIA

By Joseph Ransohoff, M.D., F.R.C.S. (Eng.)
Cincinnati, Ohio

The preperitoneal fat layer in the lower portions of the abdominal wall has the important function of aiding the peritoneum to adapt itself to the viscera, the capacity of which is constantly changing. To the surgeon it is often, by reason of its excessive development, a good deal of a nuisance. It may embarass him in laparotomies, extraperitoneal shortening of the round ligament and in the various forms of hernia. It is in relation to the latter, however, that the subperitoneal fat presents an importance, which has perhaps been overlooked at least by most English and American authors. Paradoxical, as it may seem, the fat may be the direct predecessor of a true hernia, and on the other hand may, by developing in large quantities on the outside of the hernial sac, cause its obliteration by long-continued pressure from without. Indeed, for the closure of large hernial apertures notably of the crural type, fat grafts with the pectineal fascia have been used by me with success. Chaput[1] has quite recently reported on the value of such grafts in the condition mentioned. But fat must always be a poor substitute for a firmer fibrous tissue for closing hernial apertures. Still it might be of interest to cite in brief the first case of hernia spontaneously cured through the agency of fat growth and in the quaint language of Ambroise Paré himself. "It is a priest of St. Andrew, named Jean Moret, cantor, who on Sundays sang the epistles in the church. He had a large complete intestinal hernia,

which he showed me, demanding relief, because he felt severe pain in it, particularly while singing. Seeing his suffering I told him truly that he should put someone in his place. This he did, praying the curate to substitute someone else and bewailing his own weakness. When this was accorded him he placed himself in my hands and I prescribed several remedies suitable to his sickness, also making him a bandage, which he wore during the period of five or six years. One day asking him how his trouble was, he replied that he did not know that he had any and that he was cured. That I would have never believed had I not seen it. Therefore, I took him to my lodging and saw his genital parts without any trace of a hernia, and I was greatly astounded how he could have been cured in view of his age. About six months after I thus saw him, he died of pleurisy, and being advised of his death I went to the house of the curate where they said Moret had lived and prayed him, that I be permitted to open the dead body to the end that I might learn what buttress nature had placed in the canal through which the intestines had decended. I protest before God that I found all around the groove of the peritoneum a fatty substance of the size of a small egg and attached so firmly to its surroundings that I had great difficulty in detaching it without breaking or tearing the adjacent parts. And this was the way in which a cure had followed."

Three hundred years later Boyer thought that the cure in this celebrated case had been effected by an adherent omentum. In this he paid but slight tribute to the eminent founder of French surgery. Obliteration of the sac by truss pressure and the interposition of fat is common enough, although so far as I know, it has been depicted anatomically only by Annandale,[2] from actual dissection by Turner and himself in Edinburgh. But the ruptures thus cured are no longer ruptures and that is all there is to this.

In these days when hernias of practically all types are subjected to operation, the autopsy *in vivo* has given us a

better conception of the relation of the fat, and particularly of the subperitoneal fat to hernial protrusions. Of course, it is a common experience, especially in obese subjects, to find a diffuse fat deposit closely adherent to the sac, and continued into the abdominal wall above the fibrous aperture. This fat deposit is practically always in front and to a less extent at the sides of the sac, and it often is rather difficult to determine at what level to divide it. But in these cases the fat deposit, however large, is only incidental to the hernia and has lost any etiological significance which it may have had in the genesis of the hernias. In other words, these cases are not primary fat hernias.

What then are the essentials which distinguish a true primary fat hernia? The question can be best answered by looking for them in the not uncommon epigastric hernias of the linea alba. They are fat masses or true lipomas developing in the subperitoneal layer and protruding through some vascular slit, or one resulting from a trauma of the fascia, or aponeurosis. Whether or not the funnel-shaped process from the peritoneum secondarily follows the transit of the fat mass is of subordinate importance etiologically, so far as the primary fat hernia is concerned, although the widening of the fascial slit or aperture by the fat mass and the dragging of the latter on the peritoneum may culminate in a hernia of the ordinary type.

Fat hernias in the restricted sense of the term, as above indicated, are not of common occurrence in either inguinal or crural region, although especially in the latter, the anatomical conditions predispose toward its formation. Here, except for the lymph node contained in the crural septum, the entire structure is virtually composed of subperitoneal fat, and, therefore, the protrusion of a fat mass into and through the femoral canal would be of common occurence. In an experience with hernias that is fairly extensive, I have encountered altogether 7 cases, which can be positively designated as primary fat hernias, and, curiously

enough, only two of these were of the femoral type. It is possible and even probable that essential fat hernias occur oftener than my experience with them would indicate, since for the most part these hernias are small, rarely larger than a plum, and since, as a rule, they cause little or no inconvenience, are easily overlooked, especially in obese subjects. Nevertheless, in examinations made under my observation of many hundreds of adult male subjects for positions on a railway, I have come across no case of fat hernia. Furthermore, inquiries made among my gynecological colleagues, who have performed many hundreds of shortening operations on the round ligament, failed to recall to them any case of fat hernia.

Case I.—Mrs. N., aged forty-three years, Marysville, Ohio. Admitted to the Jewish Hospital, December, 1894; mother of four children. Two weeks ago noticed a swelling in the region of the right groin, which had been pronounced a femoral hernia. Had worn a truss for a short time, but had to give it up on account of pain. The hernia was not reducible at any time.

Physical Examination. Very slender woman, without excess of fat. In the region of the right saphenous opening, covered only by the skin and superficial fascia, there is an ovoid tumor as large as a small hen's egg. It is somewhat lobulated, the skin moves easily over it and the tumor mass can be traced toward the femoral ring. There is a distinct impulse on coughing. An operation for femoral hernia was made and revealed a subperitoneal lipoma, which had followed the course of the crural canal. At the upper end of the tumor was a well-marked, fairly vascular pedicle protruding through the crural ring, but no trace of a peritoneal protrusion, past or present, was found. The upper aperture of the canal into which the tip of the finger could be easily introduced was closed with a flap of pectineal fascia and buried sutures. Curiously enough this patient presented herself three years later with an analogous

fat hernia of the left femoral canal, which had come on suddenly after a strain. The tumor was indistinctly reducible. The operation again revealed a subperitoneal fat hernia without any peritoneal sac.

It is evident that in both instances a sequestered and encapsulated fat mass had grown mushroom-like through and beyond the femoral canal without making sufficient pull on the peritoneum to cause its eversion through the crural ring.

The rapidity with which a fat hernia can develop is well shown in the following:

Case II.—Miss J. G., aged twenty-one years. Admitted to the Good Samaritan Hospital, January 16, 1906, for supposed right femoral hernia. Six months before her admission the patient had been operated on for a tumor in the site of the present lesion. An effort to reduce it was followed by fever and symptoms of obstruction, to relieve which an operation had been performed. The nature of this, or what was found, could not be determined from the scar. Two months after her admission the tumor recurred, and according to the patient's view, rather suddenly. Since which time it has increased gradually in size. An effort to retain it with a truss was short-lived, because of the pain and the difficulty of retaining it.

Present Condition. The patient is a very slight girl. In the right groin below Poupart's ligament is the scar of a rather recent operation. There is a tumor underneath the size of a small peach, which bears an impulse on coughing and can in a large measure be reduced. The sensation is that of rice bodies slipping under the compression fingers.

The operation revealed a fat hernia with a central funnel-shaped peritoneal canal. This was found only after long search and was only permeable to a probe. It is not possible that this ever contained either intestine or omentum. The crural ring easily admitted the index finger.

In considering this a primary fat hernia the question may

be raised whether it was not merely a recurrence of the old hernia with later development of fat external to the sac. Against this there speaks positively the very small thin-walled serous canal running through the centre of the lipomatous mass. I am inclined to believe that such a mass was wedged into the ring after the first operation and developed into a true fat hernia without relation to the first, if this was indeed a hernia.

There is another possible explanation of the symptoms following an effort at reduction and preceding the first operation. It is that a severe inflammation with peritoneal symptoms followed the taxis. It would not seem possible that even a fatal peritonitis might result from violent efforts to reduce a fat hernia, but such a case was recorded by Englisch.[3] The autopsy revealed a subperitoneal fat hernia without any peritoneal protrusion. The pus infiltration extended far up the anterior abdominal wall and into the cavum Retzii about the bladder.

Of inguinal hernias, I have seen what I believe to be five primary cases. It is not unusual to encounter generalized fat deposits within the sheath of the spermatic cord or the round ligament. On the other hand, a distinct lipomatous tumor mass is quite unusual, but may be encountered anywhere in the total length of the cord or ligament. Such lipomas have been encountered within the scrotum. When they develop outside of the peritoneum and push into and through the inguinal canal they form true fat hernias drawing after them occasionally a narrow tubular process of peritoneum. It is particularly the fat on the inner side of the internal ring that has this tendency to protrude in the course of the direct hernia and give rise to a fat hernia. It is curious that the onset of these hernias is often unnoticed until an accident attracts attention to them. The following is a case in illustration.

Case III.—O. J. F., male, aged twenty-eight years, dining car superintendent. Sustained violent fall in a train

accident. He experienced a pain in both groins and presented himself for examination three days after the accident. The patient was a very robust man with a well-developed adipose layer. The examination revealed what seemed to be an indirect inguinal hernia on each side. There was a tumor the size of a small peach, which seemed partly reducible, although on neither side was it possible to feel the ring. As soon as the effort at reduction was discontinued the tumor recurred, while the patient remained on his back without any effort on his part. There was a distinct impulse on coughing. There was no evidence of an injury.

Operation under gas oxygen anesthesia at the Jewish Hospital, September 30, 1912, revealed on the right and left side a lobulated and encapsulated mass of fat about the size of a small peach on the outer side of the cord and extending under the aponeurosis of the external oblique, terminating in a small pedicle. In each of the fat masses a small tongue-like sac was found extending through the centre of the mass. It was so small that a probe could barely be passed through it into the peritoneal cavity. The operation was completed in the ordinary way.

It is fairly certain that in this case the hernias had existed for an indefinite time before the accident directed attention to them. Furthermore, it is reasonably certain that neither omentum nor intestine could ever have been within the small tubular process of peritoneum. The impulse on coughing before operation was such as is found in ordinary reducible hernias. I emphasize this fact because in the differential diagnoses of fat hernias, it is generally asserted that this impulse is absent. Why it should be so, I fail to understand, since the fatty tumor comes from within the fascial and muscular coverings of the canal, and therefore, must bear the brunt of any increase of intra-abdominal pressure. In this case also the tumor masses seemed to be partly reducible, although without question this must have been a delusion.

Similar to this case, except in that it is unilateral, is:

Case IV.—Mrs. L. B., Huntington, W. Va., aged twenty-seven years; married five years without having been pregnant. About two months before admission to the Jewish Hospital, she noticed a slowly developing painless tumor in the right groin.

Physical Examination. The patient is a slender young woman and presents nothing abnormal except the local condition. Occupying the right inguinal canal and extending slightly into the labium majus is a pyriform solid tumor the size of a small pear. To the touch it is lobulated and gives the impression of an omentocele. There is an indistinct impulse on coughing and the tumor can be partly pushed back into the enlarged canal. The operation at the Jewish Hospital, February 8, 1907, for a supposed irreducible inguinal hernia, revealed a nicely encapsulated subperitoneal lipoma on the outer side of the round ligament. Through its centre there ran a peritoneal process not larger than a broom-straw.

It is remotely possible, that in this case we had an ordinary inguinal hernia operated upon at a time when a spontaneous cure was nearly completed by the development of fat on the outside of the sac, causing its obliteration by compression. Against this speaks the fact that the patient was unusually intelligent and careful of her person, and that the presence of a hernia could not easily have been overlooked. Furthermore, most of the cases of spontaneous cure effected by fat deposits, the prolonged use of truss compression has been recorded. I believe myself justified, therefore, in regarding this as a primary fat hernia, in which the finding of a central serous canal is of secondary and only incidental import.

Case V.—Father H., aged thirty-four years; Good Samaritan Hospital, February 10, 1909. The patient has had a right inguinal hernia for three years. He states that it has been of slow development and painless, except when he tried

to wear a truss. Of these he tried various models, but could not wear any of them for long because of the pain.

Physical Examination. The patient is in excellent physical health with a distinct tendency to obesity. Occupying the right inguinal canal and extending well into the upper part of the scrotum is a firm, rather smooth mass as large as a peach, presenting a distinct impulse on coughing. By prolonged effort the patient can make the swelling seemingly disappear until the finger can be introduced into the external ring, which seems as large as a silver half dollar. But even then the tumor can be felt by the tip of the examining finger. The reduction is evidently only an apparent one. The operation, February 11, 1909, reveals a perfectly encapsulated subperitoneal fat tumor on the outer side of the cord. It is easily shelled out, but at its base there are running into it some quite large vessels. In the bed of the tumor there is exposed a circular area of the reverse side of the peritoneum one inch in diameter, without any protrusion whatsoever, and moving distinctly with respiration. The operation was completed as an ordinary hernia.

This evidently was a case of primary fat hernia, a subperitoneal lipoma, which had descended the entire length of the inguinal canal like an ordinary hernia minus the serous sac.

That a primary inguinal or crural fat hernia may draw after it a peritoneal process in the way, for example, that some esophageal diverticulas are formed by traction, I have attempted to show by a number of cases above recorded. That it should be capable of doing as much for the bladder, however rarely, is shown in the following case. Unfortunately, the hospital records have been misplaced, but since I had known the patient very intimately for many years and the operative findings have remained unique in my experience, the important data as given below are accurate enough, although over twenty years have passed since their occurence.

Case VI.—D. B., aged forty-five years; was a cigar manufacturer on rather a small scale. As long as I had known him, he had been a sufferer from asthma. He was undersized and of spare habit. I am quite certain that he never weighed more than 115 pounds. For many years he had a right inguinal hernia, which was irreducible. It did not trouble him, except when he tried to wear a truss. It was about the size of a plum, indistinctly lobulated and evidently of the direct variety. Under the belief that the case was one of adherent omental hernia, an operation was advised.

The operation was one of the early ones made after the opening of the New Jewish Hospital in 1891. It revealed a fat mass of the size and general shape indicated above, protruding through the external ring. When it was drawn into the wound the deep epigastric vessels were clearly seen winding around the outer surface of the deep attachment of the protrusion. After much search, but without any unusual traction on the mass, what was believed to be a teat-like process of peritoneum greatly thickened was found. It was tentatively opened. A small quantity of perfectly clear fluid escaped, which was believed at first to be a dropsical effusion. It was not long, however, before it was recognized as urine, and the operative diagnosis of hernia of the bladder was confirmed by the introduction of a urethral sound. No peritoneal protrusion could be found. A double row of sutures and a temporary drain prevented any disastrous result from following a perhaps pardonable error both of diagnosis and technique.

The case presented was evidently one of the rarer forms of hernia of the bladder, since it was entirely extraperitoneal and in that no peritoneal protrusion whatever could be found. With the multiplying of the radical operations for hernia, many more cases of hernia of the bladder are being encountered. Some of these doubtless existed before operation, although in the great majority the hernia of the bladder is an artifact, the result of excessive traction on

the sac and the consequent drawing to the outside the uncovered portion of the bladder. Particularly are these paraperitoneal hernias of the bladder produced with comparative ease in the operations for very large hernias with wide hernial apertures. The case recorded above I believe to be a rather rare one, but one almost analogous was reported recently by Finsterer,[4] although in his case the bladder was recognized and not opened.

From the very nature of primary fat hernias they very rarely cause acute symptoms. Quite a number of epigastric hernias have been operated upon under the mistaken notion that the acute abdominal symptoms were due to obstruction or strangulation. Fifield[5] reports a case of this kind operated upon after an injury. The autopsy revealed a ruptured liver.

Quite recently a man was brought into the Cincinnati Hospital, service of Dr. Kramer, in a very serious condition, having been found delirious at his home. He had been in the hospital six months before for an acute nephritis. Concerning his present attack little could be elicited. He suffered severely from headache, and vomited profusely a clear greenish fluid. Bowels moved slightly by high enemas. There is marked abdominal distention. In the median line two inches above the umbilicus there is a tumor the size of a plum. It is hard and dull on percussion. The operation revealed a fat ventral hernia without contents. The fat was practically strangulated by a sharp ring formed by the margins of the recti muscles. The autopsy four days later showed death to be due to a chronic Bright's disease, and the little operation could have had no influence in bringing it about.

In only one of my cases of true fat hernia were mild symptoms of strangulation present and were in fact the first to call attention to its presence.

Case VII.—Miss F. P., aged thirteen years; referred to me by Dr. Forchheimer. The patient has always been well, but on the night before she was first seen, felt a sharp pain

in the right groin and on examination discovered a tumor the size of a pigeon's egg. She felt sure that it had come on suddenly.

Present Condition. The patient is a very slender girl, unusually intelligent, and would likely have recognized a growth soon after its appearance. Projecting from the right inguinal canal is a tumor like a pigeon's egg in size and shape. It is slightly movable, quite tender to the touch and irreducible. There is no impulse on coughing. Believing it to be a hernia an immediate operation was performed at the patient's home, June 6, 1907.

The operation revealed an encapsulated fat hernia with many fibrous strands running through it. The vessels on the mass were greatly injected, and at its upper end there was a marked constriction, which accounted for the condition and the onset of the acute symptoms. No trace of a peritoneal protrusion could be found.

It is easily conceivable that a fairly movable fat hernia might be subject to a torsion and give rise to symptoms akin to but less violent than those of the testicle. It is well known that the latter occurence may be identical with that of strangulated hernia. In rather an extensive search of the literature I have found only one instance of strangulation of a fat hernia through torsion. In this case, reported by Wendel,[6] what was supposed to be a strangulated femoral hernia, which had appeared suddenly, proved to be a strangulated fat hernia. The strangulation was due to a twist of the pedicle. Within the tumor mass was a very fine process of peritoneum.

In contradistinction to the above reported cases of primary fat hernia, I would desire, by way of illustration, to report the following case of fat hernia, which, however, was not primary.

Case VIII.—G. R., aged forty-nine years; admitted to the Jewish Hospital, April 15, 1910. For many years he has had a right inguinal hernia, for which he has worn a truss. For the last two years, however, he has not worn

a truss, because of the pain which it caused and because the hernia did not seem to get any larger. The patient is a very fleshy man, with an irreducible right inguinal scrotal hernia. It is the size of a good-sized peach, with distinct impulse on coughing. The operation revealed an indirect inguinal hernia. Nothing unusual presented until the sac was opened, when there was found within it a lipoma as large as a small peach and attached by a broad base. The sac itself was of the size of the finger of a glove and readily tied off. The operation was completed by the Bassini method.

Although the subject of fat hernia is far from being a new one, no extensive publication has appeared on the subject since the classical monograph by Wernher,[7] over forty years ago. The cases there collected were for the most part from autopsies. Since operations for hernias have become so common, our conception of the entire subject must necessarily be changed. There are cases of secondary fat hernias in which large deposits of fat cover the true sac. Every now and then in such a case the sac may become in part or entirely obliterated, and a serous cyst occasionally be found as the only vestige of the peritoneal protrusion. Occasionally, as in Case VIII, a lipoma will project into the interior of the sac or find its way back into the abdominal cavity.

According to my conception, certain characteristics accompany the primary fat hernia.

1. A true fat hernia is a protrusion of a preperitoneal fat mass or lipoma through one of the ordinary hernial apertures. It follows the course pursued by an ordinary hernia.

2. When a peritoneal process is found within such a hernia, it is always difficult to find, because of its small lumen. Such a process when present (in a minority of our cases) is secondary to the fat hernia and probably results from traction. The ordinary contents of a hernia are not found and can hardly enter into the narrow serous tube within the fat mass.

3. The onset of a fat hernia may be sudden, like that of the ordinary type of hernia with preformed sac. In three of the cases above recorded the history of sudden onset is very clear and the proportion of cases too large to be charged to inaccuracy of observation on the part of the patient.

4. The diagnosis of fat hernia is far from easy. Although not reducible, they are capable of a seeming reduction in a fair proportion of cases.

5. An impulse on coughing can usually be obtained, since the hernia can receive the brunt of the increase of intra-abdominal pressure like an ordinary reducible hernia.

6. In very rare instances symptoms of strangulation may result from torsion of the fat hernia.

7. The treatment of fat hernia differs in no way from that of the ordinary type. It is probable that these cases will only be recognized as fat hernias during the operation, wherefore, measures for radical cure will be instituted such as those in vogue for the ordinary forms of hernia.

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DISCUSSION

Dr. J. M. T. Finney, of Baltimore.—I have been much interested in the question of fat hernias. Some time ago, before the Harvard Medical Society of New York, I read a paper entitled "The Role of Fat in Surgery." In the course of that paper I reported 2 cases and referred to another which I had seen. The first case was that of a woman with an inguinal hernia, which had all the characteristics of that affection, among them the impulse on coughing. When she assumed the recumbent posture the swelling entirely disappeared; when

she got on her feet it reappeared. It had all the characteristics of an omental inguinal hernia, and I had no idea but that it was. On operation I found a fatty tumor which descended exactly like an inguinal hernia, but there was no vestige of a hernial sac.

The next case was in the person of a man, who had all the symptoms and characteristics of femoral hernia. I made a diagnosis unhesitatingly of femoral hernia, and found to my surprise the same condition existing in the femoral canal which was present in the inguinal canal, with no sign whatever of a sac.

I had occasion to see another case in the person of a physician with what was supposed to be a small umbilical hernia. He presented all the characteristic symptoms of strangulated umbilical hernia, such as vomiting, pain, etc. We made this diagnosis. At operation we found no sign of a sac, simply a strangulated mass of fat twisted upon its pedicle. This whole question of the role that fat can play in hernia is one that has interested me very much.

I report these cases simply as a matter of record with the cases cited by Dr. Ransohoff.

Dr. Charles Caldwell, of Cincinnati.—I have had two such cases of fat hernia, one in the epigastrium in a woman, and another which I will detail somewhat because it was interesting.

I started to operate on a man by local anesthesia for inguinal hernia which was present. The man complaining that local anesthesia did not give him freedom from pain, I changed to general anesthesia, found the inguinal canal and on carrying the incision down encountered a large mass of fat about as large as a tangerine orange in the region of the femoral vessels, and I remarked to my assistant, "this is a lipoma in this region, and I might as well remove it," and on account of the vessels I began very carefully dissecting the lipoma and had not gotten very far before I discovered there was something that looked like a peritoneal sac. The patient had the complication of this large mass of fat protruding through the femoral opening. He had the combination of inguinal and femoral hernia with a mass of fat as large as a tangerine orange in the femoral opening.

I have under observation now a young man on whom I expect to operate; I am satisfied it is one of these fat hernias.

EMBRYOGENETIC RELATIONSHIPS OF TUMORS OF THE KIDNEY, SUPRARENAL, AND TESTICLE

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INTRODUCTION

The urinogenital system presents more gross and microscopic anomalies than any other set of organs in the human body. This is because nature in the development of these organs pursues an indirect and wavering course. Nowhere else in the body are organs in the embryo first developed to a stage in which, like the mesonephros or Wolffian body, they present all appearance of being capable of active function, then only to degenerate and have their remains utilized for the building of new structures, as the permanent kidney and testis. It is only a study of the details of the intricate combinations and recombinations of the primitive factors which are used in the making of the urinogenital system that we shall come to understand in the adult either the gross surgical anomalies or those more obscure aberrations which appear to contain the explanation of the puzzling tumors of the kidney and testis. The busy surgeon and the engrossed pathologist are both apt to overlook the enormous amount of accurate detailed observation which is being made by embryologists on the development of the urinogenital system. The last decade has seen an almost complete revolution in our ideas of the essential embryology

of the system and there are yet many obscure points, which would appear to have a direct bearing upon its pathology. I wish herein to call attention to the chain of relations, to which new links have recently been added, between the development of the organs in question and their pathology.

Huntington's[4] Harvey lecture of 1907 gave such an excellent summary of the gross anomalies of the genito-urinary tract that it is unnecessary to again cover the field. I shall therefore confine myself to a consideration of the more minute embryological anomalies which concern the development of tumors, based on a study of the operative and autopsy material from the Mayo clinic and consisting of the following:

Renal tumors	92
Adrenal tumors	3
Testicular tumors	21

This material has been supplemented also by a study of the human and comparative embryology of the regions under discussion.

RENAL TUMORS

In considering the embryological relationship of the renal tumors one groups them most conveniently into (*a*) tumors of the pelvis and collecting tubules, (*b*) tumors of the cortex, and (*c*) tumors of the capsule.

(*a*) *Tumors of the Renal Pelvis.* Most of the tumors of the renal pelvis—papillomas and carcinomas—apparently arise secondarily to chronic irritative processes of the pelvic epithelium and have no embryological significance. Our series contains three pelvic papillomas, all of the angiocystic type, developing in the collecting tubules in the apices of the Malpighian pyramids. The four renal carcinomas in our series have taken their origin similarly in the collecting tubules, and two of these are demonstrably superimposed on extensive renal calculus formation.

There is, however, one tumor of the renal pelvis in our series which is apparently of embryogenetic origin (see Fig. 1). This is a squamous-celled epithelioma resembling histologically a cancer of the lip and evidently derived from the ectoderm. The explanation of the presence of ectoderm within the renal pelvis in this case is as follows:

The renal pelvis with its collecting tubules develops from the primary excretory or Wolffian duct. The primary excretory duct is initially the excretory duct of the pronephros. It is developed from the principal tubules of the pronephros which begin as evaginations of the mesoblastic parietal layer of each primitive segment stalk. It enters the cloaca low down on that structure at a point close to its rectal portion. Before the opening occurs, however, the lumen of the cloaca may be seen to evaginate into the blind end of the primary excretory duct. It will thus be seen that although the primary excretory duct is normally composed entirely of mesoblasts, there is a possibility, as an abnormality, of ectodermal cells from the rectum being carried into its lower end by way of the cloacal wall. No other way appears by which one may account for the occasional, though rare, presence of these squamous-celled epithelial tumors within the renal pelvis.

(*b*) *Tumors of the Renal Cortex.* Occasionally a renal carcinoma, arising in the renal pelvis or collecting tubules, so involves the renal cortex that its pelvic origin cannot be positively determined. There are two such in our series. Occasionally also a renal sarcoma in the adult, developing in a fibroma, which has apparently had an inflammatory origin within the renal capsule, may similarly so involve the renal cortex that its true point of origin is with difficulty made out. Much more rarely, I believe, do we have a primary spindle-celled sarcoma of the renal cortex arising from the adult connective tissue. There is but one of these of undoubted diagnosis in our series. This case is that of a girl aged sixteen years. As one reviews the

literature, he is convinced that most of the renal tumors which have been diagnosticated as sarcomas are in reality mesotheliomas or embryomas (Wilms'[3] tumors).

Our series contains two positively diagnosticated and one doubtfully (exploratory operation) diagnosticated embryomas or Wilms' tumors, one of these occurring in a child, aged two years (see Fig. 2), and the other two in children, each aged five years. These tumors trace their embryological relationship back to the formation of the nephrogenic cord, that portion of the mesothelium from the lower end of which is formed the secreting portion of the permanent kidney. In the very early embryo, the mesoderm forms a wedge-shaped plate on either side of the medullary tube. This mesodermal plate early differentiates into three portions—a thick primitive segment (next the medullary tube), a constricted primitive segment stalk, and a thin lateral plate. The constricted primitive segment stalk furnishes the material from which the tubules of all three nephritic organs are developed. From the lateral plate are developed, among other things, muscle and cartilage. As the nephrogenic cord develops from the primitive segment stalk, it is in immediate apposition to the bases of the lateral plates and it is perfectly possible for tissues from the lateral plate area to be included within the formation of the nephrogenic cord. This is especially true in the caudal portion of the nephrogenic cord which here lies closer to the lateral plate than it does in its middle and cephalic portions. Now it is from the extreme caudal portion of the nephrogenic cord that the cortex of the permanent kidney is developed. Accordingly, we should expect to find here, if anywhere within the nephrogenic structures, inclusions of the lateral plate and subsequent developments therefrom of embryonic muscle, cartilage, etc. These are the structures which, along with other embryonic cells and tubules, give the diagnosis to the so-called mixed tumors of Wilms.

By far the most numerous tumors of the kidney are the

mesotheliomas (so-called hypernephromas or Grawitzian tumors) of the renal cortex (see Figs. 3 and 4). I had the pleasure, three years ago,[12] of reporting before this Society 32 cases of hypernephromas from the Mayo clinic. Since then, I have studied 22 more such cases from our clinic, making 54 in all, and tissues from 14 cases from the University of Minnesota clinic, or a total of 68 cases. Besides the 54 cases which have been diagnosticated pathologically in our clinic, there are 17 cases which were diagnosticated by the surgeon upon exploratory operation, making a total of 71 cases of mesothelioma out of a total of 92 renal tumors, or 78 per cent. of all tumors of the kidney removed.

Grawitz's[1] hypothesis of the derivation of these tumors from adrenal rests was based upon the following: (1) The tumors are situated immediately beneath the capsule of the kidney. (2) Their cells are different from those of the epithelium of the uriniferous tubules. (3) The cells contain fat which is normally absent from the renal epithelium, but frequently present in the suprarenal epithelium. (4) The capsule of the tumor is similar to that which is found around suprarenal rests within the kidney, but which are not changed into tumors. (5) The cells of the tumors are sometimes disposed in more or less regular cordons which resemble those of the suprarenal cortex.

Grawitz's hypothesis was accepted by most observers during the next quarter of a century following its formulation. During this time it was attacked by Sudeck,[2] and finally quite effectively by Stoerck,[6] who showed that:

1. The Grawitzian tumors most frequently develop at the lower pole of the kidney where adrenal rests are not found.
2. The so-called fat of the cells of the Grawitzian tumors is usually not fat but a vacuolation related to the glycogen content of the cells.
3. The Grawitzian tumor is a tumor of the renal cortex and not of the renal capsule in which adrenal rests are usually found.

4. Although the Grawitzian tumors do frequently contain cordons, which, however, only remotely resemble those found in the suprarenal, yet they also almost invariably contain tubules, the analogues of which are never seen, either in the normal suprarenal or in the tumors of that gland.

Stoerck's very convincing evidence and arguments against the Grawitzian hypothesis I have been able to fully support by a study of our own cases, as have also the observations of Jelle,[7] Trotter,[8] Zehbe,[10] Sisson,[11] and Glynn.[15]

It has seemed to me from the first, however, that there are serious objections to Stoerck's suggestion that these neoplasms arise from regenerating convoluting tubules in the atrophic kidney. After a careful study of the embryology of the kidney and of the histological structure of 48 cases, I proposed three years ago[13] the hypothesis that these tumors are really derived from islands of nephrogenic tissue which have failed to become connected with the renal pelvis, through the collecting tubules of the developing kidney.

It will be recalled that as the primitive renal pelvic bud, derived from the primitive excretory (Wolffian) duct, grows dorsally from its point of origin, it is surrounded by a cap of mesothelial tissue, the metanephrogenic cord, which is the caudal extremity of the mass of mesothelium, from the forward end of which has been previously elaborated the Wolffian body. After the first two or three branchings of the renal pelvis, at each later subdivision for the elaboration of the collecting tubule system, this cap of nephrogenic tissue is separated into masses, one of which remains surrounding the terminus of each of the growing collecting tubules. In the later subdivision of the tubules, masses of the nephrogenic tissue are also left in the angles of the branching tubules. The nephrogenic cells of each of these small masses soon arrange themselves as an oval or spheroid about an eccentrically placed point which soon becomes a cavity, thus making of the cell mass a small, elongated, ovoidal vesicle. This vesicle then becomes fused at its

Fig. 1.—Prickle-celled epithelioma of renal pelvis. (Case A 75112.)

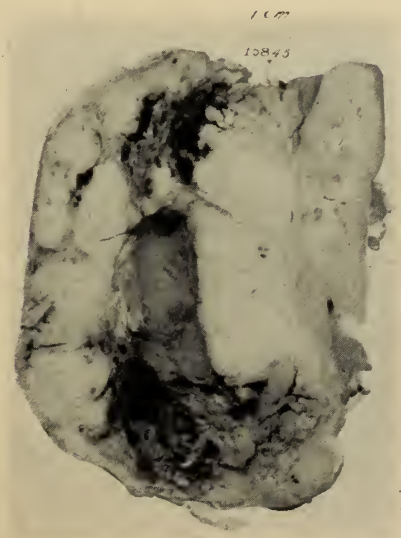

Fig. 2.—Embryoma of kidney from child two years of age.
(Case 15845.)

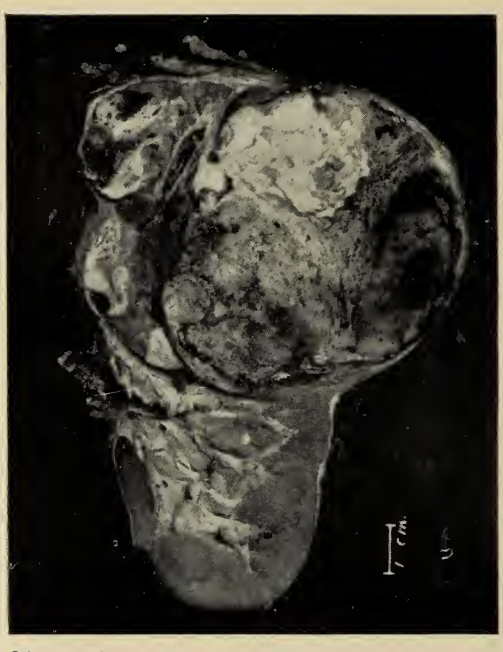

FIG. 3.—Mesothelioma of upper pole of kidney. (Case 64508.)

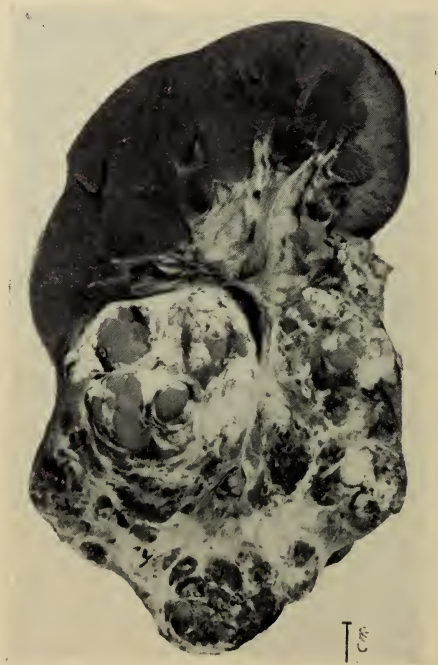

FIG. 4.—Mesothelioma of lower pole of kidney. (Case 60651.)

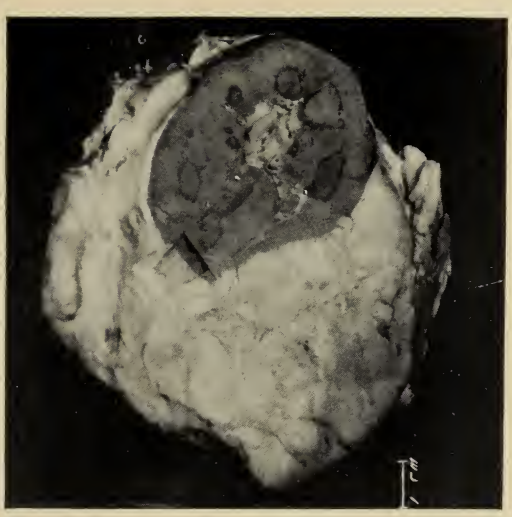

FIG. 5.—Transverse section of kidney with spindle-celled sarcoma arising in capsule. (Case A 73091.)

FIG. 6.—Adenoma of suprarenal. Longitudinal section of kidney and tumor. (Case A 66865.)

Fig. 7.—Adenoma of suprarenal. Photomicrograph, × 100 diam. (Case A 66865.)

Fig. 8.—Hypernephroma of adrenal. (Case A 72057.)

lesser extremity with the end of the collecting tubule, From the vesicle is normally formed the renal glomeruli, the convoluted tubules, the loop of Henle and the uriniferous tubules up to the straight collecting portion which is derived from the primitive renal pelvic bud.

For a long time it has been considered that the failure of the nephrogenic vesicles to form a tubular connection with the collecting tubules is responsible for the condition of congenital cystic kidney. A study of the development of the nephrongenic vesicle, however, has convinced me that such a failure in its embryonic development is responsible for much more than the formation of renal cysts. Primarily, the nephrogenic cap consists of somewhat darkly staining, round and irregularly arranged embryonic cells. In the first stages of the formation of the vesicle, it is a solid mass of cells which is frequently somewhat elongated and presenting a cordon-like appearance. In its second stage it is first an ovoidal vesicle and then a tubule. Now all these embryonic pictures closely resemble those which we find making up the histological elements of the Grawitzian tumors. I have therefore urged the hypothesis that these tumors are mesotheliomas or more definitely nephromas; that is, that they are elaborated from masses of nephrogenic tissue which have never become connected with the renal pelvis and which have never attained adult type in either form or function. In fact I feel sure that as the evidence continues to accummulate, it will show first, that the so-called Grawitzian tumors have nothing whatever to do with a suprarenal origin, and second, that they are true mesotheliomas (nephromas) arising from masses of nephrogenic tissue, the normal embryological development of which has been arrested or perverted *after* the beginning of the development of the kidney proper.

(*c*) *Tumors of the Renal Capsule.* That the renal capsule is not infrequently the site of tumors forming in its adult tissue is well demonstrated. Fibromas, and in their wake

spindle-celled sarcomas, are not rare. Our series contains one of the former and two of the latter type (see Fig. 5), all arising in adults beyond thirty-five years of age. These sarcomas of the renal capsule are apt to invade the renal cortex and be mistaken for tumors arising in this portion of the organs.

As far as its embryological relationships are concerned, the renal capsule is frequently the site of inclusions from the mesonephros, Wolffian body, and occasionally, though rarely, of inclusions from the suprarenal. The beginnings of the renal capsule are seen as embryological connective tissue concentrically arranged about the embryonic kidney as early as in 13 mm. embryos, though the actual capsule, well differentiated from the surrounding tissue, is not observed until we reach 70 mm. embryos. In the early stages of capsular development, the degenerating tubules of the Wolffian body lie in immediate apposition to, or indeed commingled with, the embryonic connective-tissue fibers which enter into the formation of the capsule. Consequently the inclusion of masses of the degenerating Wolffian tubules in the renal cortex is very easily understood. We have in our series one very well marked case of this type, that is, an encapulated mass of Wolffian tissue lying within the renal cortex.

Though it is true that undoubted inclusions of suprarenal tissue have been found in the renal cortex, I am convinced that they are much more rare than they are usually supposed to be. Several pathologists with an extensive postmortem experience state specifically that they have never personally observed a single instance. Glynn[15] in a recent careful survey of the literature has collected 17 cases to which he adds 2 cases of his own. To these we may add 1 case from our autopsy records. They are usually well encapsulated, though at least one instance has been reported in which there was no visible connective tissue between the mass and the kidney structure.

Glynn notes the following facts opposed to the hypothesis that adrenal hypernephromas arise from the remnants of adrenal cortex: (*a*) The histological dissimilarity between tumors of the renal and adrenal glands. (*b*) Renal tumors never influence growth of sex characters. (*c*) Why should adrenal rests, though comparatively rare in the kidney, produce hypernephroma, the commonest renal tumor, while adrenal rests in other localities, though comparatively common, so rarely produce tumors either benign or malignant?

While it is perfectly conceivable that such masses within the renal cortex may form malignant neoplasms, I find, neither in the literature nor in my own experience, any evidence that such is the case. Should such tumors form, they must, to satisfy the present demands of diagnosis, conform to the histological type of those tumors which we know to be primary in the suprarenal. In other words, it is but fair to assume that a neoplasm derived from wandering suprarenal cells will present the same histological elements as neoplasms derived from suprarenal tissue in its normal position.

TUMORS OF THE ADRENAL GLAND

The fact that the cortex and medulla of the suprarenal are derived from different embryological structures accounts for the great diversity of tumors of this gland. The medulla is chromaffin tissue derived from the sympathetic nervous system and the cortex is derived from the celomic epithelium. Glynn[15] has recently reviewed the pathology of the rests and tumors of the adrenal cortex. His summary and conclusions in part are as follows:

1. "Tumors (of the adrenal) are rare, especially primary malignant tumors which are represented by (*a*) round-celled sarcoma and (*b*) adrenal hypernephromas; an epithelial growth of cortical origin.

2. "Adrenal hypernephromas are associated with sex abnormalities almost invariably in children, usually in

adult females before the menopause but apparently never in adult females after the menopause, or in adult males."

A recent study of three tumors of the suprarenal which have come to our clinic adds additional evidence to the above. The first of these tumors of the suprarenal was in a woman (Case A6685), aged forty-one years, who for fourteen years had had hematuria at irregular intervals with pain in the right kidney, accompanied recently by dysmenorrhea and considerable loss of weight. A clinical diagnosis of hematuria from chronic infection of the renal pelvis was made. At operation the right kidney (see Fig. 6) was found with a very thin cortex and a distended pelvis, the seat of chronic inflammation, and giving abundant evidence of the hematuria. An encapsulated tumor as large as a hen's egg was found above the kidney, but pressing somewhat upon the ureter. Histological examination of this tumor (see Fig. 7) shows it to be an adenoma of the adrenal cortex.

The second case was a man, aged forty-seven years, who, like two cases quoted by Glynn, had been noted for years for his enormous strength. He had been perfectly well until three months before the examination when, after great exposure on a five days' tramp through slush and snow in Alaska, he developed pain and a tumor mass in the epigastrium. When brought to the clinic, there were multiple tumor growths over his trunk, head, and neck. One of these from the axilla was excised and on histological examination a tentative diagnosis of hypernephroma was made. The disease speedily progressed and the patient died four months after the onset of symptoms. Autopsy revealed large tumors occupying the position of each suprarenal (see Fig. 8). There were small metastatic nodules in each kidney, many large ones in the omentum, in the spleen, in the liver, in the heart-wall, in the lungs and in the lymphatics generally throughout the body. A careful histological study of this tumor (see Fig. 9) shows it to be composed almost entirely

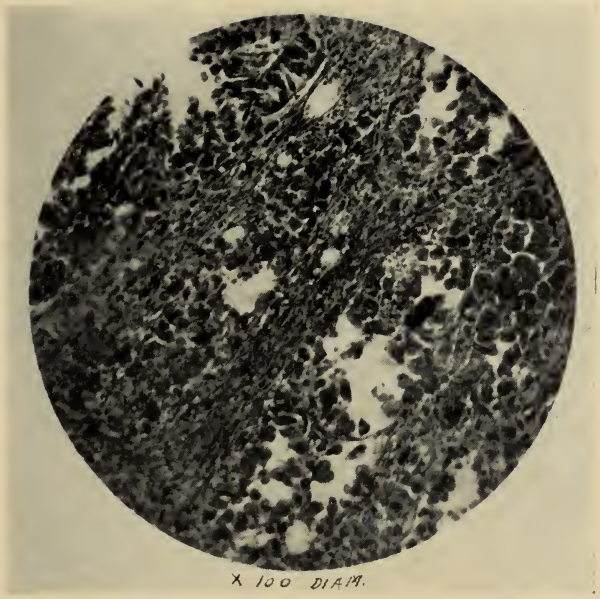

FIG. 9.—Hypernephroma of adrenal. Photomicrograph, × 100 diam. (Case 72057.)

Kidney and adrenal. Spleen. Metastatic tumor of ileum.

FIG. 10.—Hypernephroma of adrenal, with metastases to spleen and ileum. (Case A 75198.)

Fig. 11.—Hypernephroma of adrenal cortex. Photomicrograph, × 100 diam. (Case A 75198.)

Fig. 12.—Teratoma ("alveolar carcinoma") of testicle. Photomicrograph, × 100 diam (Case A 39407.)

of large polyhedral cells, with some multinucleated giant forms and a few smaller round cells, a typical hypernephroma of the adrenal cortex.

The third case was a man, aged sixty-eight years, who had had "stomach trouble" for four months. Surgical exploration revealed numerous small tumors of the peritoneal glands and small intestine. The patient died four days later of pulmonary embolism. Autopsy revealed large necrotic tumors (see Fig. 10) completely involving both suprarenals with metastases to the peritoneal glands, small intestine, spleen, and liver. Microscopically (see Fig. 11), the tumors are large, round, and polyhedral-celled hypernephromas of the adrenal cortex.

These hypernephromas of the adrenal cortex form an interesting series for comparison with the so-called hypernephromas of the renal cortex. The first case still recognizedly preserves the cordon structure of the adrenal cortex and yet one would not hesitate to differentiate it from the cordons found in renal tumors. The two latter cases, which were far advanced and are parallel in their stage of development with most of the renal tumors in our series, have lost almost entirely all evidence of cordons. Their cellular structure, however, could not by any possibility be mistaken for any of the pictures found in our series of renal tumors. It is also especially interesting to note that the fat content of the cells of the adrenal tumors is very high not only in the primary tumor but also in the metastases including those in the kidney itself. This is in marked contrast to the almost if not entire absence of fat in the cells of renal tumors.

While these adrenal hypernephromas are of particular interest to the clinician in the light which they throw on the functions of the adrenal in relation to sex development, they are of quite as great interest in the negative evidence which they supply concerning Grawitz's hypothesis of the suprarenal origin of renal tumors.

TUMORS OF THE TESTICLES

Ewing's[14] article on tumors of the testis, two years ago, has left little room for discussion, unless based on evidence furnished by new material. In brief, Ewing concludes:

"1. Pure fibromas and pure leiomyomas of the testis exist but are extremely rare as is also adenoma occurring in atrophic undescended testes.

"2. Primary lymphosarcoma and pure spindle-celled sarcoma are of uncertain origin.

"3. Chrondroma, myxoma, lipoma, rhabdomyoma, and carcinoma have not been shown to exist apart from a teratomatous origin.

"4. Alveolar large round-celled perivascular and other forms of so-called sarcoma testis are of epithelial and teratomatous origin.

"5. The commonest tumor of the testis is an embryonal carcinoma, alveolar or diffuse, with polyhedral or rounded cells and often with lymphoid stroma. These tumors are probably one-sided developments of teratomas.

"6. Teratomous testes arise from sex cells in the neighborhood of the rete whose normal development into spermatogonia has been suppressed but whose potencies remain intact and ready to express themselves in the various forms of simple or complex teratomas."

Our series of tumors of the testicle contains 21 cases, 2 of which were exploratory only, each apparently a sarcoma of an undescended testicle. The histology of the other 19 cases has been studied in detail. Although the specimens vary a great deal in their relative cell content, every one of them would undoubtedly be classed as a teratoma by Ewing. Eleven of the 19 are alveolar embryonal carcinomas (see Fig. 12) with rounded or polyhedral cells, 5 show cartilaginous and 7 myxomatous tissue with their structure. From a clinical standpoint it is somewhat interesting to

note that 6 of the 19 cases give a history of injury definitely related to the onset of symptoms in the injured testicle.

Ewing's hypothesis is that these teratomas of the testicle arise from sex cells whose normal development has been suppressed. This is interesting in relation to the recently published observations of Felix[16] on the presence of wandering genital cells in early human embryos. Felix has found, in a careful search of all of the tissue in a human embryo of 2.6 mm. (13 pairs of primitive segments), 7 genital cells, all in the immediate vicinity of the cloaca and all between it and the visceral mesoblast. In an embryo at 2.5 mm. (23 primitive segments), he found 12 primary genital cells in the same locality. Felix observes that "if these wandering genital cells are strays, they perhaps do not degenerate but may further develop, and above all divide, forming parent cells for tumors and especially for teratomas."

The genital cells are the most important cells of the reproductive glands. Until recently embryologists described their derivation from the celom. Recently, however, much evidence has been accumulating that their origin is directly from the segmentation of the ovum and it is possible that the future sex of all the genital cells is already determined at fertilization. Whether these genital cells differentiate into spermatogonia or oögonia is still unsettled. On the other hand, it is readily determined that the indifferent reproductive gland does change into testis or ovary as the case may be. In the male, this change is clearly shown in 13 mm. embryos. It consists of the appearance of anastomosing epithelium cords and the development of the tunica vaginalis between these cords and the surface epithelium. The testis cords are initially composed of indifferent epithelial cells with darkly staining nuclei. The genitaloid cells lie irregularly between these. They are found present at the time of the earliest appearance of the cords. Some of the genitaloid cells, by the time the embryo

has reached 70 mm. in length, have developed into genital cells. Branca and Bresseta[5] have shown that, while the number of genital cells in the testicle increases up to birth, after birth they entirely disappear and the tubules of the testis contain indifferent cells only. At puberty a new growth of genital cells is developed and from these are formed the spermatozoa. Popoff[9] has confirmed these observations which would seem to have an important bearing upon Ewing's hypothesis of the formation of testicular teratomas from genitaloid cells. This wide gap between the genitaloid cells of the embryo and those which form at puberty may account for the great variation in type and speed of development of the teratomas of the testicle.

SUMMARY

Renal Tumors

1. Of 92 renal tumors studied, there were 3 pelvic papillomas, 4 carcinomas, 1 squamous-celled epithelioma, 1 adenoma, 1 fibroma, 7 sarcomas, 1 Wolffian tumor, 3 embryomas (Wilms' tumors) and 71 mesotheliomas.

2. The renal papillomas and carcinomas apparently arise secondarily to chronic irritative processes of the adult pelvic epithelium.

3. The rare squamous-celled epithelioma probably is a neoplastic development from the embryonic inclusion within the renal pelvis of ectoderm which has found its way into the lower end of the primitive excretory duct by way of the cloaca.

4. The embryomas of the renal cortex composed of renal and other tissues and occurring in young children are, according to Wilms, derived from inclusions of the lateral embyronic plate within the caudal portion of the nephrogenic cord in the early embryo.

5. The most numerous tumors of the renal cortex, the so-called hypernephromas or Grawitzian tumors, are apparently mesotheliomas derived from nephrogenic vesicles which have failed in the early embryo to form a tubular connection with the renal pelvis.

6. Most of the few true sarcomas of the kidney develop primarily in adult tissue of the renal capsule and involve the cortex secondarily.

7. The renal cortex is also frequently the site of inclusions from the mesonephros and rarely of inclusions from the suprarenal gland. Rarely, if ever, do either of these inclusions in the renal cortex form malignant tumors.

Adrenal Tumors

8. Of the 3 primary tumors of the adrenal studied, 1 was an adenoma and the other 2 hypernephromas of the adrenal cortex.

9. Primary malignant tumors of the adrenal are either round-celled sarcomas or more frequently hypernephromas, arising from the adrenal cortex.

10. Adrenal hypernephromas frequently induce abnormalities of sex and strength.

11. Tumors of the adrenal, in whatever stage of their development, bear no histological resemblance to most mesotheliomas (so-called renal hypernephromas).

Testicular Tumors

12. Of the 21 tumors of the testicle, all of the 19 which it was possible to study in histological detail were teratomas.

13. So far as can be determined, the history and histology of these 19 cases are in harmony with Ewing's hypothesis that teratomas of the testicle arise from sex cells whose normal development has been suppressed.

14. The difference in time of development of the embryonic crop of genitaloid cells and the next generation which appears at puberty may account for variations in structure and *tempo* of the testicular teratomas.

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A STUDY OF UNILATERAL HEMATURIA OF THE SO-CALLED ESSENTIAL TYPE

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Until a few years ago I had held firmly to the tenets of my medical training, that hematuria from one kidney must be due to a new growth, stone or tuberculosis. All of the standard text-books of my student days taught that symptomless hematuria was angioneurotic in origin and not one of them told us that the disease could be unilateral.

My attention was first called to this condition by the following case:

Case I.—J. C., male, aged forty-five years. Complaining of several attacks of right-sided renal colic and constant bloody urine. Family and past history negative. Physical examination revealed a fat, well-nourished man with absence of any cardiovascular lesions.

Both kidneys were in their normal position; neither could be palpated on deep inspiration, and there was no tenderness on deep pressure in the loins. Cystoscopic examination showed a normal bladder with blood coming from the right ureter, and clear urine from the left. Ureteral catheterization showed blood, hyaline and granular casts from the right kidney, normal urine from the left.

Bacteriological examination of the right specimen negative; *x*-ray showed an enlarged right kidney and an in-

distinct shadow which we thought to be a stone. Operation revealed an enlarged dark kidney, lobulated with adherent capsule. Complete section from pole to pole and down to the pelvis showed nothing except a congested cortex. The kidney was closed by mattress sutures and from that day to the present time the patient has been free from colic and hematuria.

In studying the literature I find numerous surgeons have had many such experiences and in searching for an explanation various reasons have been assigned as the cause of this most unusual condition.

While Rayer, in 1841, mentions unilateral hematuria, Socoloff, in 1874 (*Berlin klin. Woch.*, 1874, vol. ii, S. 233), first reported a definite case which he ascribed to an interference with the nerve impulses to the renal vessels, a condition which we now recognize as angioneurotic edema. Following this report, Sebatier (*Revue de Chir.*, 1889, p. 62), Legueu (*Ann. des Mal. des Org. Gen.-Urinar.*, 1891, p. 564), and Broca (*Gaz. Hebdomadaire*, 1894, No. 50), record cases which they ascribe to this same angioneurotic cause.

Just about this time Senator (*Berlin klin. Woch.*, 1891, No. 1) came out with a powerful monograph refuting the cause of angioneurosis and declaring local hempohilia to be the exciting factor in these cases of unilateral renal bleeding. Aiken (quoted by W. E. Lower) follows Senator and reports seven cases of hemophilia of the kidney, these cases representing three different generations of the same family. Guthrie (*Lancet*, 1902, vol. i, p. 1243) reports twelve cases of renal hemophilia in the same family, the inheritance being entirely through the females. Atlee (*St. Bartholomew's Hospital Journal*, December, 1901) reports three most unusual types of renal hemophilia.

The arguments against the theory are that hemophilia is not a local process and these cases do not bleed from elsewhere; the condition does not follow injury and does not occur in families.

In 1897, Klemperer (*Deut. Med. Woch.*, 1897, No. 9 and 10) created quite a stir among the internists by expressing his belief that the so-called essential or idiopathic hematuria is due to a paralysis of the vasoconstrictors with dilatation of the renal vessels and a resulting diapedesis. This condition he called angioneurotic edema of the kidney and from this paper the various text-book writers received impetus for the teachings so often found therein.

The first article of dependable worth came from de Keersmaecher (*Ann. des Mal. des Org. Gen.-Urin.*, February, 1897), when he first called attention to inflammation in one or another form as the exciting cause of idiopathic hematuria and showed the definite entity of unilateral nephritis. Pousson (*Assoc. Français d'Urologie*, 1900, p. 100) reports cases of symptomless hematuria, in which he found inflammatory alterations in the glomerulus. Hofbauer (*Mitt. aus dem Gren. der Med. u. Chir.*, Band v., S. 423) also describes changes in the glomerulus. Laurent (*Deut. Med. Woch.*, 1901, No. 193) and Israel (*Klin. der Nierven*, Berlin, 1901) report cases of hyaline degeneration of the bloodvessels, while Rovsing of Copenhagen (*British Med. Jour.*, 1898, vol. ii, p. 1547) found circulatory disturbances and thickening of the capsule. Albrecht and Lowenhart (quoted by Albarran) describe interstitial lesions in the pyramids.

The most valuable contribution to nephritis as the cause of essential hematuria came from Kretschmer (*Zeitschrift f. Urologie*, 1907, vol. i, p. 490), in which he collected 129 cases from the literature, 52 of which showed definite microscopic changes of nephritis. He principally found lesions of the glomeruli and desquamation of the epithelium in the convoluted tubules. Lower (*Ohio State Med. Jour.*, October, 1910) reports two cases with nephrotomy in which the microscope showed nephritis. Casper (*Arch. f. klin. Chir.*, xxx) writes that nephritis is at the bottom of all these cases and if delicate tests for a sufficiently long time are carried out, albumin and casts will be found, failing,

the case may still be one of *nephrosis circumscripia*. In this connection Schuller (*Wien. klin. Woch.*, 1904, xvi, 477) and Israel (*Klin. der Nier.*, Berlin, 1901) both say nephritis can exist without casts or albumin. Rigdon (*California State Jour. Med.*, November, 1910) reports two positive cases of nephritis as the exciting cause and argues that hematuria is the initial symptom of chronic nephritis.

Schenck (*Surg., Gyn., and Obstet.*, July, 1911) reports two cases showing nephritis. Kotzenbergs (*Zeitschr. f. Urologie*, 1908, 125) reports twelve cases which he believes due to a bilateral toxic nephritis. He thinks the hemorrhage in these cases is the initial symptom of the nephritis, but at the time of observation only one kidney showed blood. This is most untenable, for very rarely does the other kidney ever bleed.

Along with these cases, E. H. Richardson, in a personal communication to me records a case of bilateral hematuria relieved by a right-sided nephrotomy from which an excised piece of kidney showed parenchymatous nephritis.

Turning aside from the consideration of nephritis, we find Fenwick (*British Med. Jour.*, 1900, No. 1, p. 248) describing angioma of the papillæ as the cause of the so-called essential hematurias and reporting six such cases. To support Fenwick we find McGowan (quoted by Lower), Pilcher (*Annals of Surgery*, May, 1909), Cabot (*Amer. Jour. Med. Sci.*, January, 1909), Whitney (*Boston Med. and Surg. Jour.*, 1908, vol. clviii, p. 797), reporting similar cases, and Hale White (*Quarterly Jour. Med.*, London, 1911, vol. iv, No. 16) records five cases of angioma of the papillæ seen in Guy's Hospital. Rovsing (*Ibid.*) and Israel (*Ibid.*) both admit the presence of nephritis as a cause of symptomless hematuria, but argue that usually there must be some more definite cause for the bleeding, and lay stress on tuberculosis, new growths and ascending infection. In this connection, Albarran (*Assoc. Français d'Urologie*, 1900, p. 104), Kapsammer (quoted by Albarran) and Davidsohn

(quoted by Albarran) report cases showing minute *foci* of tuberculosis. Albarran says the least lesion of nephritis is capable of determining the vascular or angioneurotic modification capable of leading to bleeding. Rovsing (*Ibid.*) says local infection plays a more important part than toxins in the production of the nephritis and Chute (*Amer. Jour. Urology*, 1907, vol. iii) argues that the nephritis may be toxic or infectious. He further says the infectious type may show blood and pus or an absence of pus, with inflammatory changes remaining in the kidney after the infectious agent has disappeared. Billings (quoted by Lower) reports a few infectious cases due to colon bacillus which were treated successfully with autogenous vaccines. Squier (*Jour. Amer. Med. Assoc.*, December 2, 1911) reports a case relieved by nephropexy, but a careful study of his report would force the burden of cause of cure upon the nephrotomy; the evident cause of blood and pus being an unilateral nephritis of infectious origin.

Since my first case I have personally observed four other cases in my private work, as follows:

Case II.—M. L. J., male, aged forty years, farmer, giving a history of persistent bloody urine for past year with dull pain in right loin. *X*-ray and physical examinations negative. Cystoscope showed a normal bladder with blood in abundance from right ureter. Microscope disclosed hyaline and granular casts from the right specimen, with absence of bacteria, while the findings were negative in the left specimen. Operation upon the right kidney showed an organ normal in appearance and size. Bisection disclosed a narrow, dark cortex, considerable congestion between the pyramids, with a few small clots in the pelvis. The kidney was closed with mattress sutures and after the fourth day the urine became clear. The patient gained rapidly in weight and has had no pain or hematuria since his operation. Three months after operation the urine showed no albumin but a few hyaline and granular casts.

Case III.—Mrs. M. W., multipara, aged thirty-five years. Complaining of repeated attacks of mild renal colic with intermittent hematuria. At times the urine was very bloody. Past history very suspicuous of gonorrhea. *X*-ray negative. Cystoscope showed slight congestion of trigone with a prolapsed, blood-smeared right ureteral orifice. Remainder of bladder normal. Catheterization of ureters showed blood, with abundance of granular casts from right side, nothing in left specimen. Bacteriological examination negative. Operation disclosed a very large lobulated kidney with many adhesions, making delivery quite difficult. Nephrotomy showed several patches of scar tissue scattered throughout the parenchyma, but nothing else. The kidney was closed and during the convalescence the patient had a few attacks of mild pain due to passage of clots. The urine cleared up before she left the hospital and there has since been no pain or hematuria.

Case IV.—P. M. J., male, aged fifty-four years. Complaining of profuse intermittent hematuria with absence of pain. Physical examination showed a pronounced anemia with great loss of weight and strength. Palpation of the kidneys and *x*-ray examination revealed nothing. The cystoscope showed a blood-stained bladder with the hemorrhage coming from the right ureter. Catheterized specimens showed blood, hyaline, granular, and bloody casts from the right kidney, while the left specimen was negative. Bacteriological examination and tuberculin test were negative. Operation and bisection of the kidney showed nothing abnormal but congestion. Following the operation the urine became clear and has remained so to the present time. This patient made a very rapid gain in weight and has been actively at work since leaving the hospital.

Case V.—H. B., male, aged forty-eight years. Farmer and alcoholic. Gives a history of periodic attacks of hematuria without pain or other symptoms. The usual examinations together with *x*-ray showed nothing, while

the cystoscope revealed a normal bladder and normal ureteral orifices. Catheterized specimens disclosed an absence of blood from both sides, but albumen, hyaline, and granular casts from the right kidney and normal urine from the left. Two subsequent ureteral examinations, one month apart, gave the same findings plus blood from the right side one time. Between these examinations the patient had several attacks of hematuria, but living ninety miles distant, I have never seen him during an attack. He has steadily refused operation, but the case I believe to be one of unilateral nephritis, with hematuria as the initial symptom and a nephrotomy certainly indicated.

Just how nephrotomy helps these patients is quite an interesting question, but it is to be presumed that it relieves congestion and by dissolving the continuity of the blood-vessels in some way interferes with the afflux of blood.

Experience has shown that nephrotomy has a favorable influence on the hemorrhage and pain of toxic nephritis and owing to the compensating hypertrophy of the intact parts of the kidney, the functional capacity does not seem to be lessened by incision and prompt suturing. Furthermore, in not a single case reported in literature has this procedure of a simple nephrotomy failed to relieve this so-called *essential* hematuria.

A SERIES OF EXPERIMENTS TO DETERMINE THE CAUSE OF THE SO-CALLED IDIOPATHIC HEMATURIA[1]

The experiments so far performed have been conducted for the purpose of excluding certain acutely developing vascular changes as being the principal cause for the occurrence of blood in the urine.

[1] From the Experimental Laboratories of the University of North Carolina.

In the clinical condition in which this so-called idiopathic hematuria develops, one of the constant findings at operation is either a patchy or diffuse fibrosis of the kidney. In addition to these interstitial changes, chronic changes involving the glomerulus are fairly constantly seen, which with certain limiatations might be called a glomerulonephritis. In this connection the question naturally arises as to whether the glomerular changes should be separately emphasized, or whether these changes should be considered as an essential part of the localized or diffuse fibrosis, the fibrosis in a given case being especially marked in and around the glomerulus.

In the experimental investigation, the dog was the animal constantly employed.

The experiments naturally fall in three groups:

1. Those experiments in which it was attempted to induce a hematuria by interference with the vasoconstrictor nervous mechanism of the kidney.

2. Those experiments in which a hematuria was attempted by the introduction of a nephrotoxic substance into the renal artery which had a special affinity for the vascular element of the kidney.

3. Those experiments in which the blood supply to the kidney was interfered with by clamping the renal artery with a clamp devised by G. W. Stewart of the Cushing Laboratory of Experimental Medicine.

Experiments of the First Series

The vasoconstrictor nerves of the kidney reach the organ by two pathways; one set of nerves passes in along with the renal artery, while the other and minor set enters the upper pole of the kidney, entering the organ from the suprarenal body.

In this series of experiments three animals were employed. The left kidney was delivered by a transperitoneal operation and cleared of its surrounding fat. By careful dissection

all structures going into the organ were severed, except the renal artery, vein, and ureter. As a result, by cutting the vasoconstrictor nerves there followed an acute vasodilatation of the renal vessels and an acute congestion of the kidney. For two days following the operation the urine was slightly increased in amount, containing a trace of albumin and occasional hyaline casts and erythrocytes. Following this period the quantity of urine returned to the normal, the albumin disappeared and with this disappearance the casts and the occasional erythrocytes also disappeared. The animals made complete recoveries.

Experiments of the Second Series

Three animals were used. The left kidney was exposed in the manner previously described. Into the left renal artery was injected 10 mg. of sodium arsenate. The kidney was replaced and the abdominal wound closed. During the succeeding three days the quantitative output of urine showed first an increase, followed by a slight decline. The urine was albuminous and contained only a few erythrocytes. At the expiration of the time the animals were killed. Histologically the kidneys showed an acute dilatation of the glomerular vessels with but slight involvement of the epithelium. In the third animal an interstitial exudate was beginning to develop.

Experiments of the Third Series

In these animals, after delivering the kidney, the renal artery was compressed with Stewart's clamp. In the first animal the compression was unintentionally very nearly complete. The output of urine by this animal was lessened. The urine was not albuminous and showed no histological elements.

With the remaining two animals the compression of the

artery was partial. The urine following the operation was slightly decreased, showing a trace of albumin; a few hyaline and granular casts and erythrocytes. The animals were killed by chloroform on the fourth day. The kidneys showed cloudy swelling of the epithelium and occasionally zones of coagulation necrosis.

The above outline of experiments apparently indicates that the condition known clinically as "idiopathic hematuria" is not dependent upon: (1) An excessive amount of arterial blood reaching the kidney; (2) it is not dependent upon an acutely developing vascular injury; and (3) it is not induced by lessening the quantitative input of arterial blood, lowering the kidney arterial pressure and inducing a passive congestion by interfering with the arterial side of the renal circulation.

These experiments would apparently contravene Klemperer's theory of angioneurotic edema, and also Albarran's idea of a slight lesion of nephritis being a sufficient cause of the unilateral hematuria.

ACUTE HEMATOGENOUS INFECTION OF THE KIDNEY

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A consideration of this type of kidney infection was strikingly presented to the profession by Brewer in 1906[1] in a report of extensive clinical experience and experimental work; was made the subject of an exhaustive paper by Farrar Cobb[2] in 1908, and has recently been further emphasized by reports from Cotton,[3] Dickinson,[4] Rinkenberger,[5] and Cunningham.[7]

The interest and importance of the matter have led me to present it to you while various features of kidney surgery are before us, and to record some personal experiences.

The kidneys which in health perform the function of removing from the body certain waste materials resulting from metabolism, are often called on to assist in eliminating bacteria and toxic materials developed in the course of acute or chronic disease.

This latter work the healthy kidney will, as a rule, carry on without acute local damage to itself. If, however, the resistance of the kidney has been lowered by previous injury or disease, it is liable to become the seat of grave surgical disorder in the presence of even the slightest infection in other parts of the body.

That kidney infection of the descending or hematogenous type is much more frequent than the ascending or urogenous type is, I believe, firmly established.

Acute septic infarct of the kidney, or acute hematogenous infection sometimes attacks persons in apparent good health, the source of the infection being some slight or almost forgotten focus, such as a felon, a carbuncle, or a tonsillitis, or may develop in the course of some acute infectious disease. In certain instances the origin of the infection is unascertainable, but in this class of cases the presence of the colon bacillus has been so frequently demonstrated that it is generally considered that bacterial absorption from the alimentary canal is the source of the infection. In rare instances both kidneys may be affected, but usually the disease is unilateral.

Microörganisms or septic emboli reach the kidney through the blood stream, occlude the terminal arteries, and produce numerous septic infarcts, which lead to rapid abscess formation with destruction of kidney substance, and the production of grave constitutional disturbance.

On exposing such a kidney, the infarcts may be seen on the surface of the organ just beneath the capsule, appearing as gray, white, or dark purple elevated areas, varying in number and size with the extent of the lesion. On section, the characteristic wedge-shape of the infarct may be seen, and necrosis and suppuration are observed if the infarct is of sufficiently long standing.

The perirenal tissue is frequently edematous.

Clinically three types of the infection may be recognized:

1. A mild form, in which, after a few hours or a few days of fever, pain, tenderness, and urinary disturbances of varying intensity, the symptoms begin to improve and there is a prompt return to normal health.

2. A more severe form with onset of varying duration and intensity, usually with symptoms referable to the urinary system, and sufficiently striking and definite for one to make an early diagnosis of infection of the kidney.

3. The acute fulminating cases, which are by far the most puzzling, obscure, and dangerous. In these cases, with

sudden onset, severe, general abdominal pain, vomiting, and profound constitutional disturbance, there are so few definitely renal symptoms, that the condition is often mistaken for acute intraperitoneal infection.

It is to this class of cases that it is most important to direct the attention of the medical profession, as every writer has pointed out; for unless our minds are alive to the possibility of such infection, a correct diagnosis will rarely be made early enough for the relief of the patient. Illustrative of the uncertainty of diagnosis we note that in Brewer's series of 13 cases, abdominal incision was first made in 3 cases; the diagnosis being infection of gall-bladder or kidney in one case; cholecystitis, subphrenic abscess or liver abscess in one case; and acute appendicitis in one case.[1]

In Cobb's series of 8 cases abdominal incision was first made in 3 cases: under diagnosis of gastric or duodenal perforation in 1 case, and acute appendicitis in 2 cases.[2]

As these attacks may come on in persons previously well, it is of the utmost importance to bear in mind the possibility of the septic renal infarct and to carry out the necessary diagnostic measures to confirm or exclude this condition wherever possible.

Cunningham, in the current number of *Annals of Surgery*, December, 1912,[7] states that there are two distinct types of acute hematogenous infection of the kidney: (1) With abscess formation, and (2) a diffuse inflammatory process without breaking down of tissue. One of the cases reported by Cotton was of this latter type.[3]

I regret that the publication of Cunningham's paper occurred after this paper was practically completed, thereby preventing me from including his statistics with those collected from other sources.

Symptoms. In most reported cases there have been some urinary changes; albumin and a small amount of blood at first, with pus later on if abscesses are so located as to drain into the pelvis of the kidney. Usually there is high fever,

frequently there are chills, there is a high leukocyte count, marked prostration in the severer forms, and always costo-vertebral tenderness of the affected side.

Pain or tenderness may be definitely located over the kidney, may be felt over one side of the abdomen, or may be general over the entire abdomen in the fulminating type.

As already mentioned, if pain or tenderness are marked in the region of the kidney, the diagnosis may be readily made, but in the fulminating cases, with more general pain, conditions so much resemble intraperitoneal disease that the kidney is very likely to be overlooked unless it is kept prominently in mind.

When suspicion is directed to the kidney, the modern methods of accurate kidney diagnosis and prognosis should, of course, be made use of. In many instances the affected kidney is so overwhelmed that its function is entirely suspended or nearly so, but in just these instances is it of the greatest importance to be sure of the existence of a second functionating kidney, for the affected one will, as a rule, have to be sacrificed.

As the septic infarct is so often unilateral, the influence of previous injury or disease of one kidney as the determining factor in localizing the infection has been duly considered and definitely proved experimentally.

A large percentage of the reported cases have occurred in women who have borne children, and have involved the right kidney. With the well-known fact that 22 per cent. of women have movable right kidneys, the relationship between the congestion resulting from undue mobility of the kidney and the production of renal infarct is obvious.

Brewer,[1] in 1906, published the result of his experiments establishing the relationship between lowered kidney vitality and acute hematogenous infection.

He produced an artificial bacteriemia in a series of dogs and rabbits by injecting into the veins virulent cultures of different organisms. In sixteen of the animals so inoculated

one kidney was exposed and injured by a blow, by bruising it between the fingers, or by ligating the ureter or vessels.

In a like number of controls there was no previous injury to the kidney.

None of the controls developed a surgical lesion of the kidney, while of the other sixteen, eleven developed distinct surgical lesions; eight being unilateral and limited to the injured side, three being bilateral; one of these showing lesions of equal severity on both sides, and two showing severe lesions on the injured side and very mild lesions on the opposite side. Of the remaining five, two died within twenty-four hours from acute sepsis, without kidney lesions, and three showed only hyperemia and parenchymatous degeneration.

The lesions produced were identical with those encountered clinically at the operating table.

In a later series of experiments, a report of which is embodied in his address on surgery at the meeting of the American Medical Association, in 1911,[6] he proved by ligating the renal artery and vein, and injecting cultures as in the other series, that both anemia and passive hyperemia of the kidney would so lower its vitality as to result in the development of a surgical lesion in the injured organ.

These experiments confirmed the clinical observations that the kidney which "had lost to some extent its normal resistance to infection by trauma, anemia, passive hyperemia, complete, incomplete or intermittent hydronephrosis, abnormal mobility, previous disease or calculous irritation,"[6] is constantly liable to the development of acute septic infarct in the presence of infection anywhere in the system.

Treatment. In the mild cases recovery will usually occur promptly and without surgical interference; however, such cases should be kept under observation until entirely well.

For the fulminating type, nephrectomy is demanded.

In the cases of moderate severity the choice of operation

will lie between nephrectomy and decapsulation, with incision and drainage of infarcts. The most discriminating judgment is required in deciding whether a kidney should be removed or allowed to remain. Nephrotomy or decapsulation may, of course, be followed later by nephrectomy, but in the very sick patient if nephrotomy does not quickly relieve, he may succumb before undergoing a secondary nephrectomy or may not survive if subjected to it.

If the infarcts are few and small and the patient's condition satisfactory, decapsulation with incision and drainage may be employed. Cotton, Cobb, and Brewer all advise this in certain cases. Cotton further advises, in case the kidney is movable and is not to be removed, that it be anchored at the same time, thereby removing any tendency toward a recurrence of the condition due to mobility of the kidney.

If the infarcts are larger and more numerous, and particularly if the patient is becoming toxic, and if it can be demonstrated that there is a second competent kidney, nephrectomy should be the operation of choice.

Each case must, of course, be decided on its merits, and here, as in so many surgical diseases, the earlier the diagnosis is made, the brighter will be the prospect for successful conservative treatment.

In the 26 cases of septic infarct reported by Brewer, Cotton, Cobb, Dickinson, and Rinkenberger, and the 2 cases reported in this paper, we have a series of 28 cases in which 15 were treated by nephrectomy with one death; 10 were treated by nephrotomy or decapsulation with incision and drainage of infarcts, with one secondary nephrectomy and five deaths; 2 cases died without treatment directed toward the kidney; 1 case recovered without treatment of the kidney lesion. From these figures one might conclude that nephrectomy should always be the operation of choice, but this series is small, and it is not unlikely that some of the cases treated by nephrotomy were

injudiciously selected, hence one's judgment should not be unduly influenced by these statistics.

The following case reports are presented:

CASE I.—*Staphylococcic infection of right kidney from carbuncle; nephrectomy; recovery.*

This case is directly traceable to a carbuncle, and is remarkable in the severity of the sequelæ of a small carbuncle on the neck.

On May 21, 1908, the patient, a white male, single, aged twenty-eight years, consulted Dr. Cabot Lull on account of a small carbuncle on the neck. Under appropriate treatment he was discharged cured on May 31. Four days later he developed an illness which proved to be an abscess of the right lung. This was complicated by about twenty abscesses of the skin and subcutaneous tissue, from several of which staphylococci were isolated. Blood cultures were negative. On August 1, he was about well, and went to his home in New York State.

During this time there were no kidney symptoms, and the urine was practically normal, at one time showing a few casts and a few leukocytes, later on being entirely normal.

On October 4, he went to bed with fever, and severe pains in back and hips, extending down into the thighs, and lasting several days. On October 13, a more severe attack occurred with temperature of 102°, abdominal pain, and nausea. On October 20, the urine contained numerous hyaline and granular casts. There was slow improvement until November 13, when he had severe pain in the right loin and the urine contained pus in considerable quantity.

From November 13 to 19, at which time I first saw him, there was fever, nausea, vomiting, pain in right loin on movement, and tenderness on pressure; he had two heavy sweats and there was a leukocyte count of 15,000 to 23,000. The urine was acid, purulent, with a small amount of albumin, and on November 19 contained blood. A diagnosis of abscess of the right kidney was made and I was

asked to see the patient. The conditions above described were found, and the patient was showing much prostration. I concurred in the diagnosis and nephrectomy was successfully performed on November 21, exactly six months after the development of the carbuncle.

The kidney was the seat of multiple embolic abscesses, the pus from which showed staphylococcus on smear and a pure growth of staphylococci on culture.

Analyzing this long-drawn-out case we see first, the local infection in the neck, next, a hematogenous infection of the lung, with abscesses in the skin and subcutaneous tissues, during which time the kidney seems to have been unaffected. It is probable that about October 4, when he began to suffer from general pains in the back and limbs, soon followed by the appearance of casts, the infarction of the kidney began, and that the kidney had been infected for some time when the first distinct renal pain was felt on November 13. This is borne out by the advanced destruction of the organ found at operation.

This can hardly be classed as a fulminating case, but as a milder case, which had reached a rather advanced stage at the time of operation. There was no history of previous injury or mobility of the organ.

CASE II.—*Septic infarct of right kidney of undetermined origin; nephrectomy; recovery.*

White, female, married, IV-para, aged fifty-five years.

The general health of this patient had always been excellent. For several months past she had occasionally suffered slight discomfort in the right loin and the right kidney was a little movable.

Two weeks before operation she began to suffer with vesical irritation, without fever or constitutional disturbance. The urine was acid, and contained a little pus and a few hyaline casts.

On August 22, 1912, I saw her in consultation with her physician, Dr. J. D. Heacock. She had just had a chill.

Her temperature was 102.5°, pulse 100, leukocytosis of 21,000, and she had great pain and tenderness over the right kidney and in the right loin.

The following day cystoscopy showed the bladder mucosa and ureteral orifices to be normal. The ureters were catheterized.

The right urine contained a little pus, and there was no reaction from the phenolsulphonephthalein in test. The urine from the left side showed a few leukocytes and epithelial cells. The phenolsulphonephthalein reaction appeared in seven and one-half minutes, and the total output in two hours was 45 per cent.

Smears from the pus in the sedimented urine did not show any organisms, and cultures were not made.

Radiographs showed that the kidney was in an abnormally low position, but were otherwise negative.

We decided that an infection of the right kidney was present, and determined that the left kidney was present and functionating satisfactorily. Operation was determined on.

On the following day the patient had another chill with high fever and severe pain.

On exposing the kidney numerous typical infarcted areas were found and we decided that nephrectomy was indicated. This was done with prompt recovery of the patient.

Pathological report by Dr. E. M. Mason: Multiple kidney infarcts.

Section through infarct: Diffuse degeneration and necrosis; uniform infiltration with polymorphonuclear cells; a few scattered early abscesses.

Summary. 1. Acute hematogenous infection, or septic infarct of the kidney is of comparatively frequent occurrence and is often overlooked.

2. Previous injury to or disease of one kidney acts as a predisposing cause.

3. While nephrectomy is demanded in the fulminating type, early diagnosis and operation will permit of decap-

sulation with incision and drainage of infarcts in certain of the milder cases, thereby saving some kidneys which would require removal if treated later.

4. The relation of movable kidney to the development of septic infarct, offers an indication for nephropexy worthy of consideration.

5. When explorations in acute supposedly abdominal conditions fail to reveal lesions sufficient to account for the symptoms present, the possibility of septic renal infarct should be borne in mind and the condition of the kidney ascertained before completing the operation.

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THE SURGERY OF THE SINGLE AND HORSESHOE KIDNEY

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The fact that developmental abnormalities of the genito-urinary system are the most frequent of any part of the body is not generally appreciated. Those involving irregularities of the circulation of the kidney are the most common of this group.

It is necessary for the surgeon of today to understand thoroughly these anomalies and he is also much concerned over the functional activity of the kidney, not alone because of operations upon the organ itself, but also because of its great bearing upon all surgical operations.

A brief study of the early development of the genito-urinary system during the first few weeks of intra-uterine life simplifies our understanding of the common and curious arrangements of the anatomy of this tract. Early in the life of the embryo the cloaca represents both the future rectum and the bladder. It gradually becomes divided by a vertical fold into two compartments, an anterior with which the allantois and the primitive excretory ducts are connected and a posterior which becomes the lower end of the rectum. Entering the cloaca from the dorsal side are the two Wolffian ducts which furnish the parent structures of the renal pelves and ureters. The Wolffian duct, while developed originally as a part of the pronephros—the forward nephritic organ which is exceedingly rudi-

mentary in the human embryo—is throughout the greater part of its embryonic existence the excretory duct of the Wolffian body or mesonephros. From these two primitive structures is developed most of the genito-urinary system. The beginning of the permanent kidney—metanephros—appears in the human embryo of from 6 mm. to 7 mm. in length as a tubular diverticulum formed on the dorsal side of the Wolffian duct near the cloaca. This diverticulum is surrounded from the first by a large group of cells (the renal blastema) which are of mesothelial origin and which later form all the secreting portions of the kidney. The tubular portion of the diverticulum from the Wolffian duct becomes the ureter, while the distal extremity bifurcates into an upper and lower portion to form the pelvis, or collecting part of the kidney. As the bladder increases in size the single opening of the meso- and metanephros becomes a double one consisting of the ejaculatory duct at the base of the bladder in the male and the ureter posterior to this (Figs. 1 and 2).

The kidney gradually ascends to the lower dorsal and upper lumbar region. As it ascends it passes and receives its blood supply in succession from the numerous arteries previously developed from the aorta to nourish the mesonephros. As many as five of the branches may be carrying blood to the kidney at once. As the kidney ascends and higher arteries become attached to it the lower ones separate from it. When it reaches its final position one of the arteries enlarges and becomes the permanent renal supply. This is usually the upper member of the lower or the lower member of the middle mesonephric group. Thus in anomalies of position the vessels may arise from the sacralis media, from the common iliac, the inferior mesenteric or along the line of the aorta. If irregularly situated they are usually increased in number. In the division of the kidney into upper and lower portions with separate pelves the division of the vessels permits of the removal of one-half of the

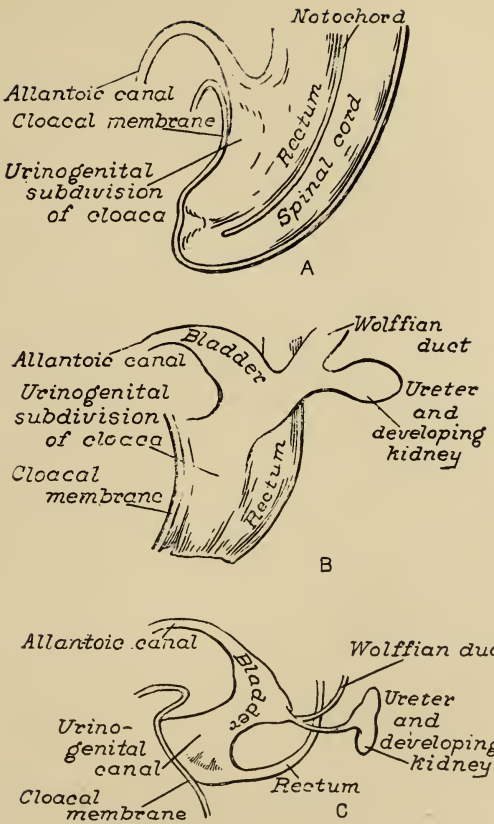

FIG. 1.—From model by Professor Keibel. (Cunningham's Anatomy.)

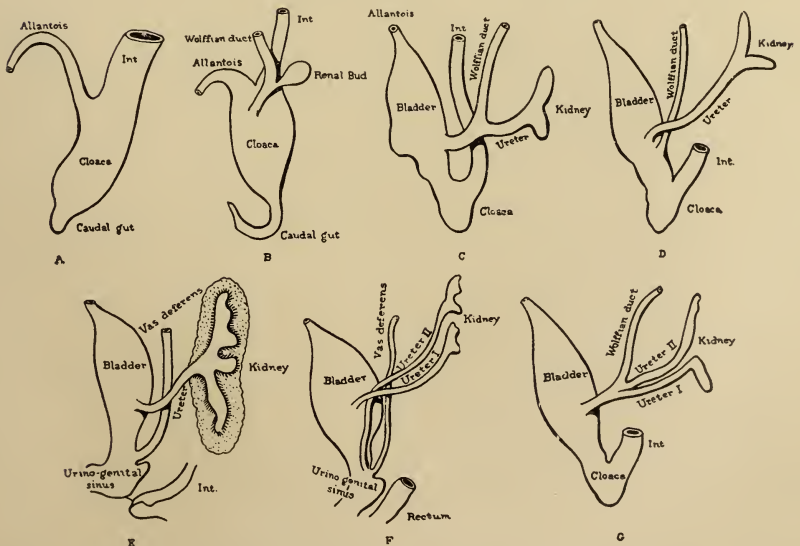

FIG. 2.—From Dr. George S. Huntington's paper on "The Genetic Interpretation and Surgical Significance of Some Variations of the Genito-urinary Tract."

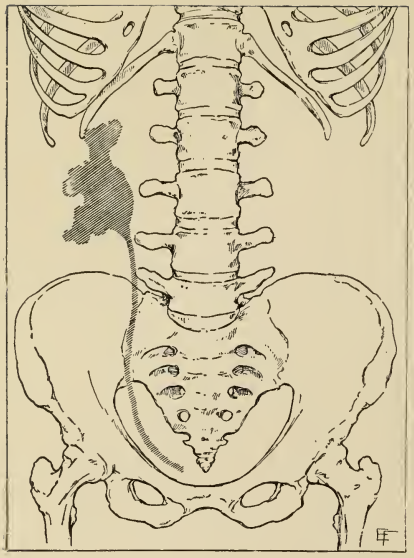

Fig. 3.—Case No. 5244. Congenital single kidney.

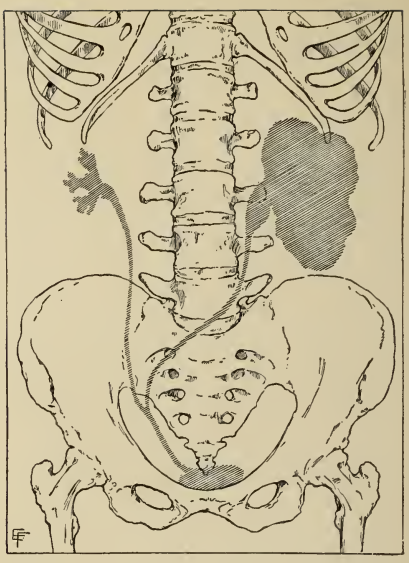

Fig. 4.—Case No. 1142. Division of ureter at lower third. Left branch crosses spine and leads to a large hydronephrosis of the left kidney. Right kidney normal.

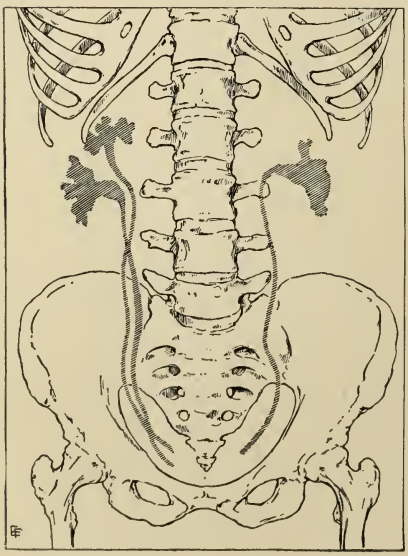

Fig. 5.—Case No. 10,962. Duplication of the pelvis of right kidney and ureters. Normal.

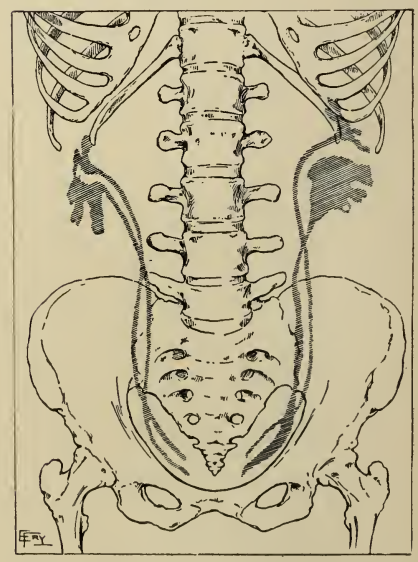

Fig. 6.—Case No. 13,529. Bilateral duplication of ureters and pelvis. Duplication of left kidney pelvis complete, with small hydronephrosis of the lower pelvis. The two pelves of the right kidney united by common calyx.

FIG. 7.—Exterior of horseshoe kidney, showing large hydronephrosis caused by valvular constriction of ureter at ureteropelvic juncture.

FIG. 8.—Half of double kidney and ureter. Removed at operation for stricture of ureter.

FIG. 9.—Section of horseshoe kidney, half showing (1) large hydro-ureter caused by stone in bladder; (2) pyonephrosis.

Fig. 10.—Half of horseshoe kidney. Removed at operation for hydronephrosis.

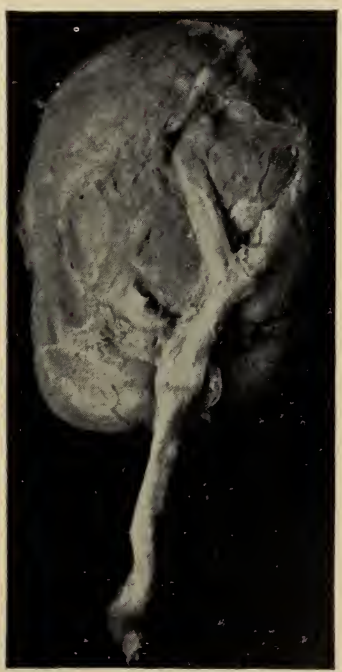

Fig. 11.—Note division of ureter into three parts at site where the renal pelvis should have been (autopsy specimen).

FIG. 12.—Exterior of horseshoe kidney. Note lobulation. Kidney could be easily divided at either interlobular depression.

FIG. 13.—Exterior of one-half of horseshoe kidney with ureter removed at operation.

Fig. 14.—Exterior of horseshoe kidney with but one ureter. No distinct narrowing between the two halves (autopsy specimen).

Fig. 15.—Pelvic kidney, showing blood-supply arising at juncture of iliacs and entering upper pole of kidney (autopsy specimen).

organ without injury to the other half. In horseshoe kidney, however, Robinson[1] found 10 out of 60 cases reported with but a single artery branching to each lateral mass, and 4 cases with a single trunk to the isthmus, with one branch to either lateral mass. In such cases the accidental destruction of the blood supply of the entire kidney may easily occur during an operation upon it.

There is nothing between the two renal mesenchymal structures during the early development of the kidneys but the forming aorta. Sometimes indeed they are in contact or even fused in front of or posterior to this vessel. This condition persisting, occasions some of the various anomalies under discussion. Rarely the secreting substance may become associated with but one collecting portion and ureter and thus there may be but one kidney developed.

We may see the possible development of congenital cystic kidney resulting from a failure of certain portions of the secreting renal tissues to become connected with the collecting portion. Wilson[2] has called attention also to the probable development of the so-called hypernephromas as neoplastic growths from similarly unattached portions of the secreting portion of the kidney. The bifurcation of the end of the ureter may be so extreme that an upper and lower kidney may be seen on one side with an upper cleft and a lower single ureter, or a complete cleft one, varying according to the point of division of the metanephric diverticulum. The attachment of the secreting substance across the spine may drag one ureter across the midline. Two ureters to one kidney are not uncommon and very rarely three ureters have been found as in the case reported by Bransford Lewis.[3] In the otter each calyx has a short ureter, all delivering through one ureter into the bladder, a form rarely seen in man. Küster[4] observed the right ureter formed of three branches, two being from the isthmus, while Gebhardt[5] reports one with five branches. We have seen two ureters to one kidney with variously located divisions, in five cases

other than in those of the horseshoe type. The openings into the bladder may not be abnormal, depriving us of the aid of the cystoscope alone in making a diagnosis (Figs. 3, 4, 5, 6).

The ureter normally is twelve inches long. In a low placement of the kidney it may still be long and coiled or very short. Thompson's[6] case of pyonephrosis in a horseshoe kidney had a ureter but one and one-half inches in length.

As to the relative frequency of this anomaly it is difficult to say since statistics vary so much. Those collected by Thompson[6] show one in 300 autopsies to those of others who place it as seldom as one in a thousand. Our own autopsy records in a single year have shown as high as 4 per cent. of cases presenting gross anomalies of the kidney or ureter of surgical importance.

Of 36 cases of gross renal and ureteral anomalies observed during five years in our clinic, 7 were found incident to other abdominal operations. Among the total number were 12 of the horseshoe type and 6 of the congenital single or asymmetrical type. During this five-year period, 649 operations were made upon kidneys or ureters. Excluding those diagnosticated and not operated on and the cases found at autopsy there was an average of one serious anomaly associated with the disease in every 26 cases, thus showing that such anomalies of kidney and ureter are often the cause of or are a contributing factor to disease of this structure (Figs. 7 to 15).

Robinson's collected statistics show that in the horseshoe form 90 per cent. are fused at the lower poles, and in the others it was reversed, the convex surface being upward. If the positions of the kidney are not symmetrical they are of the L-shaped or irregularly fused form, the lower kidney being drawn to the midline. At the point of union there may be only connective tissue (in 15 per cent. of the cases); usually, however, it consists of true renal

tissue and varies from a small area to the full width and thickness of the kidney. Robinson found 90 per cent. of cases fused in front of the great vessels.

Among the irregular forms are the sigmoidal—upper and lower pole fused—and the unilateral gross kidney.

Several classifications of horseshoe kidney exist. The oldest grouping by Neufville and Freund[7] admitted form as a criterion, the attachment being at the lower or upper poles. That of Förster[8] was based on the degree of fusion, regardless of the point of attachment. The classification of Heuer[9] was based on situation and included unilateral and L-shaped kidneys. That of Carlier and Gerard[10] is based on form and situation. They state that a horseshoe kidney is a congenital malformation consisting in a connection, more or less close, of two similar poles of the kidneys in front of the spine, showing more or less clearly the form of a horseshoe, with equal or unequal branches. They divided them into two classes, symmetrical and asymmetrical.

The most common disease affecting horseshoe kidney is hydronephrosis which later may develop pyonephrosis. Hydronephrosis occurs in moderately young individuals, while pyonephrosis and lithiasis which also occasionally may be found in horseshoe kidney are usually seen in middle age or later. All three of these conditions may be present in one side of such a kidney.

Tuberculosis is rarely seen, but when present is diagnosticated by the usual symptoms of hematuria, disturbance of the bladder, and the finding of tubercle bacilli in the urine. It is located by cystoscopy and the separation of the urine from the two sides. König[11] and Gibbon[12] each report sarcoma of one-half of the kidney in children, both cases recovering from a transperitoneal removal of the growth. Cystic tumors of such kidneys which have necessitated the removal of one-half in one and puncture of cysts in another have been reported by Bockenheiner. With

reference to sex, more horseshoe kidneys are found in women than in men and more single kidneys in men than in women.

For a long time the observations made upon horseshoe kidney showed that the condition could not be discovered save at operation or autopsy, except in those cases where the abnormal kidney attained a pathological alteration. Since surgical interventions were rare, patients suffering from grave troubles, due to the presence of horseshoe kidney, died without the cause of their symptoms being ascertained. It is very probable that some of these symptoms do not produce sufficient disability to cause the patient to consult a physician, especially when the connecting link between the kidneys is connective tissue. Heavy renal tissue so placed undoubtedly gives symptoms if we can rightly interpret them.

Rovsing's[13] recently published cases of horseshoe kidney with operative verification are very suggestive. In 3 cases the same symptomatology was noted, the predominant symptom being pain experienced in the abdomen and lumbar region and beneath the epigastrium. These pains generally radiate downward and usually manifest themselves while the patient is standing upright, being then almost continuous. They are mitigated greatly by rest and disappear completely after prolonged rest in bed. These patients suffer severely from continuous jarring and the suffering is increased by muscular effort, such as lifting. Throbbing and a sense of pressure in the abdomen may occur and upon bending backward their discomfort is greatly increased. From their situation such kidneys are more liable to injury, compression of the abdominal vessels may occur and a case of thrombosis of the iliac and femoral veins, causing edema of the legs and ascites, as reported by Neufville.[14]

In the diagnosis of horseshoe kidney the associated anomalies of the genital system are to be considered as they are developed together. Such conditions are fre-

quently noted with congenital kryptorchadism, hypospadius, atresia of the anus, double or bicornate uterus, absence of vagina, etc. Such cases have been reported by Tillmanns,[15] Gerster,[16] and others.

In spite of the fact that there is sufficient data on this subject to permit of a diagnosis, it will not as a rule, be made before operation except in the minority of cases until the subject is kept more in mind by the diagnostician. Most of the cases reported are accidental findings in the course of operations on the kidney or other abdominal organs, or are contained in postmortem reports. In a number of instances, horseshoe, irregular, or gross single kidneys have been removed from the body before a diagnosis has been made. We have at our disposal then the physical examination and, as Braasch[17] points out, in addition to the cystoscope and radiograph the great assistance obtained by pyelography with colloidal silver injections. The latter are more accurate than the opaque ureteral catheter, especially in establishing the diagnosis of multiple ureters and pelves. In horseshoe kidney and irregular varieties of double kidney of a congenital type, in the congenital single kidney (more rare than horseshoe kidney) and in the single kidney with atrophy or destruction of the other through disease we have conditions which tax the diagnostic ability of the surgeon to the utmost. The lesson we must learn then, in every case in which we are not positive of the condition is, always to explore the other kidney, usually through a separate incision, before removal of a tumor of the kidney or the removal of a diseased kidney, and in abdominal surgery in which tumors of unknown type and origin are discovered, regardless of location, the kidneys should be palpated before removal of the tumor.

Operation. In some instances the incision will be a transperitoneal one. The lateral incision described by W. J. Mayo[18] will suffice in most cases. It is as follows:

"Beginning at a point two or two and one-half inches

lateral to the dorsal spines, near the outer margin of the erector spinæ muscle, a longitudinal incision is made two or three inches in length through the skin, superficial fascia, and posterior layer of the lumbodorsal fascia (vertebral aponeurosis) which covers the erector spinæ muscle. The incision lies behind the twelfth rib from the angle, if present, nearly to the head, and reaches downward to a point one-half inch below the angle. From this point the incision passes obliquely downward and forward along the anterior margin of the quadratus lumborum muscle to a point an inch above the crest of the ilium, and there turning, runs forward parallel to the iliac crest as far as necessary.

"The posterior superior lumbar triangle (Kelly) just beneath the twelfth rib is then exposed by cutting an opening through the external and internal oblique, transversalis, and latissimus dorsi muscles, exposing the transversalis fascia in its lumbar portion. This fascia is then opened freely, exposing the perirenal fat. The ilio-inguinal and iliohypogastric nerves are identified and retracted out of harm's way and the lower part of the incision completed. The twelfth rib is then cleared in its posterior portion, upward and backward, nearly to the articulation of the rib, with the transverse process of the twelfth dorsal vertebra and the pleura pushed upward. By retracting the erector spinæ muscle on the one hand and the costal margin on the other a wide exposure is accomplished at the point of previous inaccessibility. As a rule, the kidney can readily be drawn through the incision to the surface with but little traction. The incision is easily closed and there is little or no danger of hernia."

As these cases will often be discovered during operation on the kidney the possibility of horseshoe kidney must be considered when it is unusually difficult to deliver the lower pole. This occurred in my last case, one of pyonephrosis of half of the horseshoe kidney. The renal tissue nearly the full size of the normal kidney passed in front of the large

vessels. After examination of the blood supply, which is so frequently abnormal in such cases, this tissue was divided and sutured with catgut. In a case that was not pathological, other than the abnormality, Rovsing has relieved the pain and general symptom by division of the isthmus.

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DISCUSSION ON THE PAPERS OF DRS. WILSON, PAYNE, MASON, AND MAYO

Dr. Robert Milne, of London, was asked to open the discussion on these papers. He said: Mr. President and Gentlemen.—Frankly, it is rather difficult to get one's breath after following these four papers to which we have just listened, because they contain such excellent material both in quantity and quality.

I am afraid I cannot group the four papers together so as to make my remarks apply to the four as a group, and therefore, I must simply take up each one seriatum.

I was very much interested in the paper of Dr. Wilson because hypernephromas give rise to much difficulty in England. Dr. Wilson describes them as mesotheliomas. I am here for the purpose of discussion and therefore disagree with him. In the first place, these mesotheliomas are difficult tumors to diagnosticate, but judging from endothelioma, mesothelioma, and epithelioma elsewhere these tumors of the kidney are not the same. In the first place, as shown by these pictures, you find that these endotheliomas or mesotheliomas of the kidney have the same naked-eye characteristics, usually well encapsuled and, secondly, have a distinct yellow color. Years ago these tumors were described as lipomas of the kidney, and until Grawitz described them as hypernephromas, everyone short of making a microscopic examination, thought the majority of them were lipomas. Of course, from the naked-eye appearances you cannot diagnosticate the nature of the tumor, but you can do so by microscopic section. However, in these pictures you will notice what we regard as characteristic, a large kidney cell with small central nucleus; it is best described by calling it a dropsical cell. I should be very glad if Dr. Wilson had mentioned whether he stained these cells for glycogen. In true hypernephromas you find these cells become full of glycogen, a thing you do not get in other endotheliomas, but you do get in the cells of the cortex of the suprarenal, and therefore frankly, in spite of Dr. Wilson's excellent exposition of these two facts, the typical dropsical cell, and no statement as to the amount of glycogen found in these cells, we still believe that these hypernephromas are analogous to the cortex of the suprarenal. We find that condition not only in these hypernephromas of the kidney, but we have had one case occurring in the right lobe of the liver. We found another hypernephroma in the hilum of an undescended testicle. In both cases you have typical dropsical cells and the glycogen granules. In this type of renal hypernephroma, with tubule formation, it would be difficult to tell from a decapsulated section whether that was or was not a carcinoma of the renal tubule, and only by the character of the cell and the presence of glycogen can you tell the difference.

Passing on to an analogous subject, namely, these tumors in the cortex of the suprarenal, we find they are comparatively common. It does not say much for the excellence of our staff at the London Hospital when I state that we do 1200 post-

mortems a year and our pathologist is exceedingly careful. We find, especially in old people, small minute bodies of deep yellow color, which have been described as adenomas. They are so constant that one man had advanced the theory that these little adenomas in the cortex of the suprarenal are the essential cause of arteriosclerosis. He knew, of course, the suprarenal extracts send out blood pressure, and his idea that these suprarenal adenomas secreting this fresh substance should give rise to arteriosclerosis. The theory is ridiculous. This fresh substance we use for suprarenal extract is a secretion of the medulla; it has nothing to do with the cortex at all, and these little adenomas cannot have anything to do with arteriosclerosis. What the importance of them is we do not know. I believe they are not true adenomas, but simply regeneration nodules in the liver, in cirrhotic liver. You may call them adenomas, but it is better to call them regeneration nodules. We find liver cells from bits of the liver tissue destroyed by the sclerosis, and these little renal adenomas must be the same thing.

With the large tumors of the cortex of the suprarenal we have that interesting condition, of which a photograph was passed around, namely, precocious puberty.

Two men at our hospital, Dr. Bullock and Dr. Sequire, have had 10 cases and their specimens are in the hospital museum. It shows how one can get different impressions when we come across rare cases.

There was one case of carcinoma of the kidney, and another one of epithelioma of the pelvis. We have had 4 or 5 cases. I am sorry I cannot give the exact figures of carcinoma of the renal tubules, and not a single one associated with stones. I have had 2 cases of epithelioma of the renal pelvis; microscopic section showed prickle-cells and both associated with stones, exactly the opposite condition which Dr. Wilson got in his cases from Rochester. There are several other things I would like to say in connection with these tumors, but we must push on.

With regard to this essential type of hematuria, Dr. Payne mentioned Mr. Fenwick's case of angioma of one of the renal papillæ. I saw one of these. There was absolutely no doubt about it. The woman had had attacks of hematuria for years. Mr. Fenwick split the kidney from end to end. On the papilla there was a little red spot not longer than a pin head. By

microscopic examination it was found to be a simple angioma. Following the operation the patient had absolutely no trouble, and therefore we must look upon that as one of the causes of essential hematuria. Secondly, I believe that people with chronic nephritis may get a severe hematuria. By chronic nephritis I mean those who have a high blood pressure, thick arteries, hypertrophied heart and urine of low specific gravity. It is undoubtedly clinical nephritis (chronic Bright's disease) and a lot of them will bleed. Dr. Wilson drew attention to the importance of painless hematuria as the first sign of renal tumor, and if we could only trace every case of hematuria to its origin, without giving it drugs, and letting it go away, we would save far more cases of renal tumor than we are doing today. But if you are going to operate on all kidneys that come to you simply with hematuria, then you are going to get into trouble, because you find this bleeding with nephritis is not a rare condition, and therefore the risk of operating upon these cases of nephritis that bleed compared with the advantage of exploring both kidneys and the chance of finding a tumor, is not comparable, and therefore we form a rule which all prominent urologists speak of, namely, you must not operate for hematuria until with the cystoscope you have tested from which kidney the blood is coming.

I saw one horrible case afterward which was watched for two years. He had hematuria and at each time in cystoscoping him the bleeding stopped. When we caught him we found the tumor had gone too far to cure him. There was already a growth in the renal vein.

With reference to the paper of Dr. Payne, if he divided the renal nerves, leaving the artery and vein, I would like to have him tell us whether the blood pressure in that kidney was increased or decreased. It is true, the kidney may be more congested, but of course if you cut the pelvis the kidney vessels swell, and therefore that would tend to lower the blood pressure, and unless there were some means of testing the blood pressure, I should want to know whether or not blood pressure was the cause of any bleeding from the kidney. He got a few casts and blood cells, but that can be explained by the handling of the kidney during the operation. In the third experiment he mentioned I could not see how putting a clamp on the renal artery sent up the blood pressure in that kidney. It would decrease the blood pressure, and therefore we would

not expect to get bleeding from the kidney from the condition. I am inclined to believe, Mr. President, that we know very little about the effects of clamping or tying the renal artery. In Adami's excellent pathology you will find experiments described where in animals the renal artery was tied for half an hour, and when the ligature was removed the wound was sewed up. What was the result? In ten days' time, if you decide to cut the kidney with a knife, the kidney cuts the knife instead of the knife cutting the kidney. It was one mass of calcareous material. It was shown by a series of experiments that there was one mass of calcareous degeneration, and that was the effect of complete ligature of the renal artery for the space of half an hour. A more positive explanation of these cases of essential hematuria of my mind is the simple arrangement of bloodvessels. You find some of the cases are cured by splitting the kidney from top to bottom. You find other cases are not cured. Is there any explanation? Yes. You remember, in going through the kidney substance in the pelvis of the kidney to get at a stone, you usually go through Broedel's line at the junction of the anterior two-thirds and posterior third; if you split the kidney along its convex border, you get far more bleeding because you cut more vessels. That is what you want in the relief of this essential hematuria. You want the opposite. I do not know about the circulation through that kidney, therefore you can split along the prominent convex border. If you avoid disturbing these vessels by cutting along Broedel's line, the punishment fits the crime, or the remedy fits the disease. You are careful to prevent disturbing the vessels and cannot expect to cure the essential hematuria.

In connection with hematogenous infection of the kidney, I am handicapped by the phraseology employed. Dr. Mason spoke of infarction of the kidney. What we mean by that is, when you take out a kidney, you have a definite wedge-shaped, usually anemic, sometimes congested area; later on, years afterward, you will find by postmortem examination a depressed scar. Now, I do not picture that as an acute hematogenous infection of the kidney, but a picture rather of an acute pyelitis, possibly streaks of pus running up the pyramids, an acute pylephlebitis, but usually a pyelitis. That, of course, we used to say, was an ascending infection of the bladder. It is wrong. Every case is an infection from the arterial system. The kidney is perfectly capable of throwing out germs with no harm to

itself. In patients with phthisis you can find tubercle bacilli in the urine, and therefore the presence of tubercle bacilli in the urine, unless you have pus with it, is no proof of tuberculosis of the urinary tract. You take twenty pregnant women, you will find in at least four or five of them the bacillus coli in the urine, but only one perhaps in nine will complain of any symptoms referable to the urinary tract. These people think they have got constipation or pressure; they have germs or organisms floating around in their circulatory system, but the kidneys can throw them out, provided the kidneys are healthy. But if you have those kidneys damaged, then the kidney cannot do its work and you are in trouble. Why do pregnant women get pyelitis on the right side? Coming down to the postmortem room again, if you come across a pregnant woman you will find the right ureter coming down and passing over the common iliac artery on the right side, and the uterus lying a little over to the right and pressing on that ureter. Judging from the postmortem rule, it is physiological to find above the common iliac artery a dilated ureter. It is not so, but sufficient to make all the difference between the infection of the kidney on the right side and a healthy kidney upon the left side. Very often the kidney may be movable in addition and get an additional source of injury, but we look upon an acute infection of the right side in a woman as due partly to trauma, and secondly to the germs which are floating in the system which, after all, is not such a rare condition in these constipated women. It has been proved conclusively on animals, but it has been worked out upon these women.

I should like to say in regard to the treatment of these conditions, that although the right kidney is so frequently infected alone, I should hesitate to remove the right kidney until we had proved by microscopic examination and by cultures the left kidney was perfectly healthy. Frankly, gentlemen, the worst case I ever saw was one in which, instead of removing the kidney, I removed the appendix, just as the previous speaker described a typical case of peritonitis starting upon the right side, went for the appendix as probably the local source of trouble, and removed a perfectly healthy appendix. But that woman was about as bad as she could be, although we did absolutely nothing to her kidney, I believe the majority of these cases will get better by themselves if we will try and ease the pressure upon that kidney.

I have given you my reason for saying that the great source of trouble is pressure of the uterus on the ureter. To take the pressure off the ureter, put the woman in bed. If you put her flat upon her back the uterus will press upon the ureter, therefore, that won't do. You have got the choice of two things: You can either raise the head of the bed to aid the flow of urine downward, or, better still, let the woman lie on her face in a kind of hammock in order to allow the uterus to drop forward and no longer press upon the right ureter. Give her enormous quantities of water to flush the kidney, and one of our bacteriologists has had excellent results in these cases of acute coli infection from giving anticoli serum. In that serum you also have dead organisms, and therefore you have really the opsonic treatment. But he has only had in these acute coli infections excellent results with anticoli serum. For the chronic cases of pyelitis, which we are not considering, anticoli serum is absolutely useless. In the extreme cases where they do not get better with conservative treatment, the next thing would be to empty the uterus. If that is unsatisfactory you go down, explore the kidney, if it is movable, bring it up, fix it so that it will drain, possibly decapsulate it, possibly remove it. The cases where the kidney has been operated on for these acute hematogenous infections must be exceedingly rare.

Mr. President, I do not feel it is my place to criticize Dr. Mayo's paper and I shall not do so. I should like to relate a case in this connection which may prove of interest to the members of the Association. A man came in with a tumor in the hypogastrium. He gave a history of urinary trouble, and the surgeon passed a catheter and drew nothing. The next day a puncture was made above the pubes and fluid was drawn off. The man went on passing urine. He passed all right through his urethra and also fluid which was drained through the pubes. A surgeon came along and explored this swelling above the pubes; it was difficult to locate, but evidently was an abdominal cyst. He could not get it out, so he simply drained it. The surgeon was jeered at for tapping a mesenteric cyst. The house surgeon collected the fluid by glass; the surgeon was jeered at again. The man was passing half of his urine through the urethra and the other half above the pubes, and the conclusion was reached that we must have a hugely dilated ureter upon the right side, apparently the left side doing its work all right, and decided to remove the

right kidney to cure the fistula. Cutting down upon the right kidney it was found there was none. Following that they traced the wound still farther down and found a horseshoe kidney lying on the front of the promontory, and what the house surgeon tapped and the surgeon had drained was really a hydronephrosis of the right half of the horseshoe kidney.

Dr. Francis R. Hagner, of Washington, D. C.—I have listened to the reading of these four papers with a good deal of interest, and particularly to Dr. Mason's paper regarding septic infarct. I believe Dr. Milne got off the track a little on this. He speaks of colon infection. These cases are not colon infection except in very rare instances. In most of them it is more apt to be an infection from the staphylococcus or some other pus organism infection. He speaks of pus in the urine. Most of these cases do not have pus. If they do have pus, it is very little, and there is practically no pyelitis until late in the disease.

I have had one case in a child, aged eleven years, following an attack of tonsillitis, in which there were two infarcts in the kidney. These were removed with recovery of the patient. Both ureters were catheterized; the kidney was infected, but there was no pus present. There were a few leukocytes in the urine, but no pyelitis present in that case. I believe that there was very little pus obtained in the urine collected by ureteral catheter in Dr. Cunningham's group of cases. Dr. Mayo's paper was interesting, and it shows one remarkable thing, namely, how these patients with solitary kidney can live with such destruction of the kidney. I recall a case in which solitary kidney was diagnosticated before operation. By catheterization of the ureters and injection with argyrol of the kidney pelvis, it showed just a large irregular shadow in the *x*-ray. The patient had had numerous attacks of renal colic indicative of calculus and had passed several small calculi; treatment was instituted, and operation advised against. She was under treatment one year, passed no stones, but large masses of purulent material passed through the ureter which caused typical attacks of ureteral colic. She demanded something be done for her on account of her suffering. At operation an enormous kidney was located, opened, and drained. The patient died ten days after operation apparently from gastro-mesenteric ileus, as she vomited enormous amounts of fluid with no symptoms of uremia. At autopsy there was a distinct

kinking of the duodenum over the vessel with marked dilatation of the stomach. There was but one kidney present, being a large, dilated, thin-walled pus sack, with very little cortical tissue remaining, and one ureter. There was no kidney on the opposite side, no vessels coming off from the aorta at the point where the usual vessels should be, and no signs of adrenal tissue. This woman was aged thirty-eight years, had pain in one of the kidneys before her marriage. She was the mother of two children, one twelve and the other sixteen years of age. She was enormously stout and fairly healthy and yet was alive with only a shell of a kidney to support life.

Dr. Payne's paper was very interesting. He spoke of 3 cases I had had of bleeding from the kidney that ceased after ureteral catheterization. These patients came under my observation between ten and twelve years ago, and I have not had such a case since. I was almost afraid to report this experience because it sounds so absolutely "fishy" and unlikely, but it is absolutely true, as I can prove by the patients themselves and by my assistant. One case had had bleeding for eight months, another case for a year, and the other case for thirty-five years. In all 3 of these cases there were no cellular elements in the urine but blood. There was no pus present. These three patients are alive and well today. The patient who had had bleeding for eight months, about a year ago developed thrombosis of the pampiniform plexus. No operation was done. Whether that has any relation to the bleeding or not, I am unable to say, but I simply mention this fact. In the man who had bleeding for one year, the hemorrhage stopped immediately after catheterization. This patient is well today. It is more than ten years ago. The man who had bleeding for thirty-five years was examined by several prominent surgeons of that day, among whom were the father of Dr. McGuire, Dr. Nathan R. Smith, and Dr. Tiffany, of Baltimore. They advised against any operation at that time. All of these patients had no frequency of urination, and no symptoms except blood in the urine. When I first saw the man who had bleeding for thirty-five years, he looked like a patient in the last stages of malignant disease, being very short of breath, anemic, and weak. His bladder was examined, found normal, and his ureters catheterized, blood passing from right ureter; the next morning the urine was clear. On microscopic examination there was blood still present, but at the end of the week blood disappeared

from the urine, and a year ago he was apparently perfectly well. He weighs 45 pounds more than he did when examined, and was accepted for $10,000 life insurance. I cannot explain this case, but the fact remains the bleeding stopped immediately after ureteral catheterization.

Dr. Joseph Ransohoff, of Cincinnati.—We have cases of fixation of the kidney, congenital in character, but in these cases the fixation is due to the fact that originally the kidney got an abnormal blood supply low down and was fixed. If the kidney takes its blood supply from a certain source, and stays where it was originally, if it does get a new blood supply, throwing off its old supply, it is the only organ with which I am familiar that does that. Even the cecum in its wide peregrinations retains the blood supply it originally had in embryo, and this is also true of the uterus, ovaries, and the testicle. I should want some authority to substantiate the statement that the kidney gets a new blood supply as we get a new scar, or as we change our location.

May I be permitted to say a few words in the way of reminiscence? Yesterday our distinguished president in his address called to my mind the excellent judgment of Billroth as a pathologist. I question very much whether Billroth had any superior in surgical judgment, and in this connection I want to mention briefly a case. The case is of interest because of the remarkable diagnosis made before anyone thought of cystoscopic examinations. A patient was brought into the hospital in Vienna on a Saturday afternoon and I saw the man with Billroth's assistant, Gussenbauer. The man had had no symptoms until about a week before his admission, at which time he was seized with a chill and complete suppression of urine. Gussenbauer introduced a catheter and found the bladder empty. Anuria was complete. Billroth never saw the patient until he was brought into the clinic on Monday morning and had the history read to him. He felt the patient's abdomen, and said there was a mass in the abdomen low down. He tried to introduce a large silver catheter and said "I can introduce it into the bladder, but the bladder is empty; I cannot depress the handle of the catheter; I can push the beak to one side, and then to the other, but in the centre it strikes the mass I feel in the abdomen. This mass must be an abscess of some sort." He made a rectal examination and felt a mass above the prostate that was fluctuating. He said,

in all human probability, this is a suppurating right kidney that has fallen down and presses upon the left ureter and causes the complete anuria. He asked for a large trocar which was handed to him, and this was pushed through the rectal wall into the abscess; pus flowed from the cannula, and the urine began to flow at once from the catheter left in the bladder. This was to me a most brilliant thing in surgery, so far as diagnosis is concerned, at that time. Through the large cannula left in the bladder he introduced a drainage tube, which drained until the patient had his first movement, and then the drainage tube came away. Operation was done three or four days afterward, again showing the excellent judgment of this great surgeon, who exposed the abscessed cavity by an enormous incision in the loin, such as one would make for tying the iliac artery. He got into the tumor, put a drainage tube through the abscess, and at the other end a drainage tube through the rectum, and tied the two over the groin in a knot. That patient died, of course, of peritonitis; this was surgical judgment of a good many years ago. That case was reported in the *Medicinische Wochenschrift,* but I cannot tell you in what year.

Dr. Bransford Lewis, of St. Louis.—Dr. Mason suggested in his paper that we compromise on the subject of operating on these cases of hematogenous infection of the kidney; that some are properly a subject of nephrectomy, while others are the subject of incision and drainage. I believe that if that suggestion goes unqualified and without further definition, it will lead to sacrifice of a number of kidneys. For instance, pyelitis and pyelonephritis, while differing from hematogenous infection, resemble it closely enough to give rise to grave mistakes unless the distinction is clearly made between them.

Ordinary pyelitis and pyelonephritis are often amenable to topical antiseptic treatments administered through the cystoscope and ureteral catheters, without requiring any form of operation; and yet if the above-mentioned distinction is not made such conditions are liable to be unnecessarily subjected to nephrotomy or nephrectomy.

In this connection I remember two patients who were brought to me during the past year, the subject of acute and severe pyelitis, each of whom was scheduled for nephrectomy, in case I confirmed that position. Before undertaking the operation the physician and the surgeon in charge of the case said,

"Let us go and submit it to Lewis to see what he says." The patient was a little girl, about twelve years of age, who had very severe pain in the right side. She had a suppurating colon bacillus infection of the kidney pelvis and some inflammation of the kidney. I catheterized her, got good urine from the left kidney, and infected and purulent urine from the right, and washed the pelvis with argyrol. I did that three times, and within a month the child was well, and she did not lose her kidney.

The other case was a trained nurse, who had had severe inflammation in her right kidney pelvis. She had had her appendix removed in an effort to relieve her sufferings. She was also a candidate for nephrectomy and was in just the same position as the other case. I catheterized her and obtained good urine from the left kidney, and purulent urine from the right side, in which there were indications of inflammation and infection. The colon bacillus was the cause of infection in both these cases. After three or four different applications of argyrol irrigations to the kidney pelvis, she got well, retained her kidney, and has been well ever since. In that case I have thought that a contributory cause for the infection was a very tight urethra which caused obstruction to the escape of urine from the bladder.

I do not believe the general practitioner, or the general surgeon for that matter, can always make an accurate differential diagnosis as to whether the infection is limited to the kidney pelvis alone or involves the kidney, and the sacrifice of the kidney or incision of the kidney should be taken up only in connection with the consideration of catheterization and irrigation.

I was delighted to hear the caution of Dr. Milne in reference to the duty of the practitioner in the case of hematuria. The average practitioner, when he has a case of hematuria, thinks it is his duty to give the patient medicine and stop the blood in the urine, which is absolutely wrong. The surgeon often thinks it is his duty, in the case of hematuria, to make an exploratory incision, which I also think is absolutely wrong. There is a clean cut duty for the physician and for the surgeon to perform in the case of hematuria, and that is to apply the physical investigation that will determine not only the source of the bleeding but the nature and causation of it before any therapy is applied at all.

Dr. Guy LeRoy Hunner, of Baltimore.—I would like to emphasize the point that was brought up in Dr. Mason's paper just as Dr. Lewis has. It is difficult in the early stages to differentiate between a pure pyelitis and a so-called pyelonephritis. I quite agree with Dr. Milne that we should reconstruct our terminology somewhat. It is difficult to know what different men are writing about sometimes in discussing kidney infections. In both the pyelitis and pyelonephritis infections the patients may be profoundly depressed and the infection may start in with a chill and the patient be extremely ill to begin with. If we, as Dr. Lewis says, undertake the operation of nephrectomy at that stage on the ground that we probably have a septic parenchymatous nephritis, we would sacrifice a good many kidneys that should be saved; in other words, we would remove some pyelitic kidneys. On the other hand, if we defer operation on one of those cases in which the kidney substance or parenchyma is involved, the question arises whether we are not waiting until the other kidney is infected. That was the conclusion, I believe, of Dr. Mason's paper, that these cases are at first usually monolateral. I do not believe we know enough about these cases to be able to make that statement. It seems to me, that perhaps a great many of them are bilateral from the beginning, and that the symptoms happen to be more severe on one side than the other so that our attention is called to that side. I remember particularly two cases which illustrate this point, one of which occurred while I was a resident in the Johns Hopkins Hospital. Dr. Kelly operated and simply split the capsule of an extremely large congested right kidney, whose surface showed infarct areas, necrosis in depressed areas on the surface, and in addition multiple foci of infection following various blood streams through the surface of the kidney. That patient's symptoms had been referred to the right side up to the day before operation, when she had developed symptoms on both sides. She died the day following operation and I was permitted to remove both kidneys. You could not tell from the amount of destruction and character of the infection which of the kidneys was the first to become involved. It seemed as though in this case both kidneys must have been involved about the same length of time.

In a case of my own, brought into the hospital with almost lethal hemorrhage, I, after investigation, decided to split the

kidney, and found the source of hemorrhage to be a small ulcer in the papilla, boiling up like a spring with blood. I whipped catgut around this ulcer, stopped the hemorrhage, and the patient recovered. A slice of the kidney parenchyma taken for microscopic examination showed multiple foci of necrosis. Two years later on investigating strictures of the ureters, I found she had in all probability infection of the other kidney at the beginning. She had signs of a chronic nephritis, pus in both kidneys, and strictures in both ureters. That case followed an acute attack of tonsillitis.

Dr. Wilson (closing the discussion on his part).—I wish to state briefly the essential difference between what we expect of tumors having a suprarenal origin and those having a renal origin. In the first place renal tumors are always of the multiple histological type, while suprarenal tumors never have but one histological type. In the second place, the adrenal tumors have a lot of true fat in them. A section of these tumors stained with Herxheimer's stain gives a circus-poster effect. Tumors of the kidney, on the other hand, contain little or no true fat, but glycogen instead. In the next place, the cells of these tumors from the suprarenal are mostly rhombohedral. The cells in the adrenal itself are rhombohedral. But the cells in renal tumors are rarely rhombohedral. Tumors of the adrenal show cordons as does a typical adrenal itself, but they do not show tubules. No one has yet seen a tubule in the normal adrenal nor in a tumor of the adrenal in the human; yet in these tumors of the kidney they are constant factors. They are in every one of our cases. This case is not a carcinoma of the kidney, because in the same tumor from which the specimen was derived we got all the other histological structures which are common to renal mesotheliomas. In the next place, of the so-called hypernephromas, over 50 per cent. were tumors of the lower renal pole. The adrenal never at any stage of its development gets near the lower pole of the kidney. When the adrenal is first forming there is more than 70 per cent. of the entire length of the embryo between the kidney and the adrenal. It never comes in apposition to the kidney until there is a mass or capsule formed around each organ. When we do find true adrenal rests in the kidney there is usually a capsule between them which can be split into three pieces: First, the capsule of the kidney, then the capsule of the adrenal, then between them the fibrous remains of the Wolffian body

itself. Mr. Milne spoke of finding adrenal rests in the kidneys in many of the 1200 autopsies made each year at the London Hospital. We also frequently find these minute inclusions in the renal cortex. The only trouble is that they are *not* adrenal rests. They do not have any cordons or rhombohedral cells or fat in them as they should if they were of adrenal origin. We have been calling these adrenal rests simply because someone else has designated them as such. Some of them are true Wolffian rests and many are atrophic renal tubules. So far as the origin of the so-called hypernephromas of the kidney—the renal mesotheliomas—is concerned, the only difference between those of us who are studying a series of these cases lies in the question as to whether they are derived from proliferating adult renal tissue in the atrophic kidney or whether they are derived from renal rests or masses of embryonic renal tissue. It seems to me, in brief, that they are derived from embryonic rests, because they represent in their histology the embryonic evolution of the secreting portion of the kidney and that they are not derived from adult renal tissue because they do not reproduce the adult renal cells. The bulk of these tumors is made up of embryonic tissue, which is not adrenal embryonic tissue. Anyone who had studied groups of these tumors of the kidney and of the adrenal and compared them side by side will not be mistaken, I am sure, as to their essential differences.

Dr. Payne (closing the discussion on his part).—I am indeed very grateful to our distinguished visitor, Dr. Milne, for criticizing the experiments made. I feel, however, that in directing his remarks particularly to the experiments he has entirely misconstructed the outcome of that work. In the first instance, these experiments were undertaken primarily with reference to unilateral hematuria. Their failure was the one positive thing about them, namely, there was more or less acute congestion of the kidney, and that brings us to the vital point Dr. Mayo brought out of pressure in the kidney. In the first series of experiments it was not a question of pressure, and since Dr. Milne asks about that and wants to know how a clamp such as that devised by Dr. Stuart on the renal artery can modify pressure, I will tell him we have an instrument with which we can definitely determine the variations in the pressure of the kidney. In the first series of experiments we found the arterial blood was increased. In the second series

of experiments vascular injury was produced; in the third series the pressure in the kidneys was lower; we had a clamp on the artery and passive congestion was produced. As I said in the beginning, we believed that this condition of unilateral hematuria is not due to malignant growths or to tuberculosis, but is one of chronic nephritis. The solution of it is this: the hematuria is due to rupture of a glomerular vessel, and the high blood pressure he speaks of; in other words, a local arteriosclerosis, is the cause of keeping up the bleeding.

Finally, I would like to call attention to another point about unilateral hematuria. If you recall the histological anatomy of the kidney, the bloodvessels come nearest to the urine: (1) In the glomerulus; (2) around the uriniferous tubules; (3) in the papillæ; (4) in the mucous membrane of the pelvis. We have two sets of vessels, one in the cortex, and two sets near the pelvis. As a matter of diagnosis in unilateral hematuria, we know from one of these cases that if we inject the pelvis of a bleeding kidney with a styptic, such as adrenalin, and get a cessation of bleeding, we can naturally conclude that the condition is due to a lesion in the pelvis. If the styptic injections do not stop bleeding, we naturally conclude it is a lesion of the cortex. In using this as a diagnostic measure, I would warn against the possibility of relying entirely on these things. In other words, we are liable, when we do that, to stop bleeding from a malignant growth of the pelvis, cloud the symptoms, and let the case go on to a further stage.

Dr. Mason (closing the discussion on his part).—The discussion on my paper has convinced me of one thing, namely, its opportuneness, because there seems to be a misunderstanding concerning the pathology of the condition. Brewer, whom I mentioned in my paper, brought this prominently to the attention of the profession by original work and numerous observations as far back as 1904 and 1906. At that time he not only called attention to this acute unilateral condition, but showed that the lesion was an acute septic infarct of the kidney or rather multiple septic infarcts, essentially cortical in its nature, the infection reaching the kidney through the blood stream and plugging up the vessels. That pathology has been proved by Cobb and others whom I have mentioned. I think Sampson has done some work along the same line. I have not gone extensively into the literature of the subject because recently so much has been written about it. Infarcted kidney as Cotton

calls it, rather than acute septic infarct of the kidney, as Brewer calls it, ought to be recognized and the condition treated properly early. Pyelitis plays no part in the pathology of this condition, and pyelonephritis is a different matter altogether.

If Dr. Milne will refer to the beautiful photographic reproductions of Brewer's specimens in *Surgery, Gynecology, and Obstetrics*, for May, 1906, he will see extensive cortical infarcts; he will also see them on sections and will observe that the kidney pelvis, except in the late cases held over a long time without proper diagnoses and treatment are unaffected.

In pyelitis we get early pyuria of considerable quantity, also desquamation of the renal pelvic epithelium. The question has arisen as to whether we could make a differential diagnosis between pyelitis and septic infarcts. I have not gone into that in this paper. In pyelonephritis of pregnancy, ureteral catheterization will afford relief. I had a case this summer, five months pregnant, of typical pyelitis, or pyelonephritis and left the catheter in the right ureter for some hours. Her temperature, which had been 102°, was reduced to normal in two days. A few days later she began to suffer again and I left the ureteral catheter in for nine hours, and the woman remained free from pain and temperature and went on through pregnancy. She still has some pyelitis.

When the infarcted kidney is extensively damaged, it will quit secreting urine, and in such a case the retention of the ureter catheter or the irrigation with antiseptics, as Dr. Lewis has suggested, will be of no value. In the pyelitis cases the passage of the ureter catheter with or without irrigation of the kidney pelvis will often give relief.

The septic infarct of the kidney is a cortical lesion entirely different from pyelitis or pyelonephritis. It should be recognized as a clinical entity, and the diagnosis should be made whenever possible.

If one suspects intraperitoneal disease and finds on operation that he is mistaken, it is advisable, judging by the experience of Cobb, Brewer, and others, to investigate the condition of the kidney before abandoning the operation.

If a septic infarct is found or, if the diffuse infection spoken of by Cotton and Cunningham is encountered, the kidney should be removed or decapsulated and the infarcts drained.

The point I intended to make in regard to early operations which was referred to by Dr. Hunner is this:

In the more severe types of renal infarct, if an early diagnosis is made, one may expose the kidney, decapsulate it, and drain the infarcts, bringing about recovery without removing the kidney; whereas, if there were much delay the septic process would extend so far that nephrectomy would be demanded.

Dr. Mayo (closing).—In his address our president, Dr. Finney, said "art is long." It seemed to me in studying the anatomy and embryology of my subject that our art is rather short. In any event, I became so interested talking about embryology in my paper that I forgot to say much about treatment, and I suspect that is the reason why there was so little discussion.

THE POSTOPERATIVE COMPLICATIONS OF PROSTATECTOMY

By Francis R. Hagner, M.D.
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Most of the data contained in this paper is the result of an experience in prostatic work, extending over a period of fifteen years.

There is nothing so instructive to a surgeon as a careful review of his postoperative complications and unfortunate results, as it makes him more careful and lessens the liability of their repetition. It is very pleasant to think only of the good results. When we have a group of cases that do well we begin to feel that we are real surgeons, and it is just at this time that some unfortunate occurrence brings us back to earth again.

The first postoperative complication that we will consider is hemorrhage. This usually occurs in the first forty-eight hours after operation. It is nearly always of venous origin and can usually be controlled by pressure. We have had several cases that have had secondary bleeding during the first thirty-six hours following operation, all of which have been controlled by pressure. The use of gauze soaked in adrenalin solution, if hemorrhage is not controlled by iodoform packing, is valuable. One of the times when hemorrhage is liable to occur is when the tube and packing are removed from the perineal wound, all of which can generally be obviated if peroxide of hydrogen be injected into the

wound before an attempt is made to remove the gauze. The bubbling of the peroxide loosens the gauze which comes away readily.

In suprapubic prostatectomy the hemorrhage will be controlled by packing the capsule with gauze, as it is noted that the capsule immediately contracts down upon the gauze, thereby causing pressure. It is also possible at times to pick up the bleeding point and either ligate or control by forceps. I have recently had a case in which the hemorrhage was controlled at once by passing a rubber catheter through the urethra, drawing it through the suprapubic wound, tying a knot in the eyed end, wrapping gauze around the knot and catheter shaft so as to form a plug. A silk suture was then passed through the catheter tip and brought out of the suprapubic wound to facilitate its removal. The catheter extending from the penile urethra was drawn forward, a small pad of gauze wrapped around the glans penis and the catheter held in place by passing a safety pin through it at right angles to the axis of the catheter. This patient had had profuse prostatic hemorrhage for ten days, and thus being exsanguinated, it was highly important to guard against further bleeding after the prostatectomy. The packing and catheter were removed in forty-eight hours with no return of hemorrhage. Although I have not seen the patient since operation, his convalescence has been rapid. Our only fatal case of hemorrhage occurred in a perineal prostatectomy twelve days after operation. The patient was up and about with no fever, apparently doing well; he sat on the commode to defecate and when he was found by the nurse he had fainted from loss of blood. On my arrival at the hospital the hemorrhage had ceased, but the patient was practically moribund. After transfusion the perineal wound was opened and the clots removed. Although the skin wound was nearly healed, in the deeper tissues there was no attempt at granulation. This patient had very marked arteriosclerosis and this probably accounted

for the failure of tissue reaction, as there was no indication of sepsis.

Thrombosis may be one of the unfortunate results of prostatectomy. The only form with which we have had any experience is the pulmonary. Young has had two cases of sudden death from this complication, one immediately following the giving of an enema. We have had one fatal case that occurred five hours after operation. The patient was a man, aged sixty-five years, in excellent condition and was one of the simplest cases we have had. He was seen by a resident at five o'clock and found to be in good shape, at five fifteen he complained of shortness of breath, severe pain in side, and coughed up some blood and bloody mucus, in ten minutes he died. No autopsy was allowed, but it was unquestionably a case of pulmonary thrombosis.

Pneumonia is a complication, but if care be exercised it is rare. The administration of the anesthetic in these cases is of the utmost importance and, in fact, it is almost of more import than the operator. The secret is to just keep the patient under, and they ought to be out of the anesthetic before leaving the operating room. Any success we have had in these cases has been due more than any one thing to careful etherization, and during the last few years to the employment of nitrous oxide and oxygen. At best these patients are all old men and supposedly bad cases for an anesthetic. The inverted position of the patient in perineal prostatectomy unquestionably lessens the liability of mucus being carried into the lungs, and lessens in that way the liability to inspiration pneumonia.

Sepsis occurs less frequently in perineal prostatectomy than suprapubic on account of the drainage afforded by this route. If symptoms of sepsis do occur, nothing is so efficacious as salt solution by hypodermoclysis or tap water by Murphy's method in the rectum.

The use of continuous irrigation immediately following operation both in the perineal and suprapubic routes is

one of our best methods of preventing sepsis, and in those cases that give evidence of sepsis, the two-stage operation, either perineal or suprapubic, with continuous irrigation for even as long as a week before the prostate is removed, will unquestionably save cases that otherwise would be lost. In cases of severe infection of the bladder it is well to have made up at the time of the operation or before an autogenous vaccine to help overcome this infection and to lessen the danger of sepsis or the severity of sepsis should it occur.

Uremia is a condition that has to be very closely looked after and pre-operative treatment will in a large percentage of cases prevent this complication. The phenosulphonephthalein test as advised by Geharaty is of great importance in determining the functional activity of the kidney. A large percentage of these cases have diseased kidneys, either chronic inflammatory conditions or chronic suppurative conditions, and the patients to be looked after most carefully are those having large amounts of residual urine, as the relief of back pressure in the kidney during the drainage of the bladder makes them especially liable to supression. If signs of this occur, salt solution combined with sweating and other appropriate treatment produces excellent results; although a good deal is now being written against the use of salt solution there is no question of its value in these cases as a large percentage are unquestionally suffering from purulent infections of the kidneys. There is no one thing to which Young attributes his brilliant results, than to the free and oft-repeated use of salt solution when indicated.

Patients suffering from diabetes are proverbially bad subjects for operation and are the worst class of cases for prostatectomy. We have lost one case of suprapubic prostatectomy from this complication. The patient, aged seventy-six years, had symptoms of diabetic coma before operation but under large doses of sodium bicarbonate his improvement was very rapid. He did very well for five

days after the operation, when marked diminution in the amount of urine secreted was noted, the patient became comatose and there was a marked excretion of acetone, the whole room being permeated with this odor.

My fourth death occured from bichloride poisoning due to an attendant starting a continuous irrigation of 1 to 1000 bichloride immediately following the operation. This patient developed all the symptoms of bichloride poisoning: spongy gums, fetid breath, profuse diarrhea, and an acute hemorrhagic nephritis, the urine being made up almost entirely of blood casts. The bichloride continued running in this patient for about twenty minutes. After dressing I went in the ward to see how the patient was doing and noticed the coagulated appearance of the fluid from the outlet tube. On pouring some of the fluid out of the fountain syringe and on testing it was found to be bichloride. Quarts of salt solution were used to irrigate the bladder but enough absorption had already taken place to produce the marked poisoning already described from which the patient died.

In the great majority of cases the relief of obstruction is complete if all of the obstructing portion of the prostate is removed. In perineal prostatectomy the operator can never be sure that this is true unless he takes the additional precaution of passing his finger into the bladder to feel the internal urethral orifice after the prostate is removed. This was painfully brought to mind in one case in which I removed a very large prostate but left a lobe coming from above the urethral opening that caused practically complete obstruction. It was necessary to perform a second operation from which the patient finally had an excellent result.

There are some patients that are never able to entirely empty the bladder after prostatectomy, where from prolonged distention of the bladder and from prolonged cystitis the contractile power of the muscle is lost because of the infiltration of the muscle with inflammatory tissue. These

patients are perfectly comfortable and have no inconvenience from the ounce or two of residual urine.

The continuation of pus in the urine after prostatectomy is due to three conditions: (1) The infected kidneys, (2) to a preëxisting cystitis of years' duration, where the bladder mucosa is so badly diseased that it never recovers and, (3) to the presence of diverticula in the bladder. These patients often experience no inconvenience and can be kept perfectly comfortable with an occasional bladder irrigation. In other cases it is remarkable how a severe pre-operative cystitis is perfectly cured by a prostatectomy and the consequent relief of obstruction. In fact some seemingly incurable cases of cystitis have been cured following operation.

Postoperative frequency of urination is due to two conditions: (1) A contracted bladder, and (2) a loss of control. Contraction of the bladder follows a certain percentage of prostatectomies and can be overcome by careful bladder dilatation under hydrostatic pressure. I have had cases that could hold only three ounces, which by careful dilatation would hold at the end of three weeks as much as twelve ounces.

The cause of the loss of control after perineal prostatectomy is a debatable question. It is unquestionably due to the destruction of the muscle at the neck of the bladder, in the prostatic urethra, or in the membraneous urethra. I have always used care in preserving the membranous urethra and have had but two cases that have not eventually recovered from a temporary incontinence. Some cases are able to hold and void their urine from the time of removal of the tube, twenty-four hours after operation. Some of these patients have to be taught to hold their urine by having regular times to urinate, in the same manner in which children are taught. The late Dr. Sam Alexander of New York had what he called "His class in urinary incontinence" in which he filled their bladder with solution, had them pass a certain amount at his command, and to cease uri-

nating at the command "stop." By this method he has certainly produced some wonderful results.

Injuries to the peritoneum have occured during both perineal and suprapubic prostatectomy, being followed by peritonitis causing the death of the patient. We have been fortunate enough to escape this complication. The complications which have probably brought the most disfavor upon perineal prostatectomy are rectovesical and recto-urethral fistulas. Unquestionably when these complications develop from tearing of the bladder wall into the rectum and tearing of the prostatic urethra into the rectum it is usually caused by too rough manipulation and by *not separating with care* the anterior wall of the rectum from the posterior surface of the prostate before any attempt is made to remove the hypertrophied gland. Care should always be taken after the removal of the prostate to pass the gloved finger into the rectum to be sure that no tearing of the rectal wall has taken place. Should an opening be discovered it should be sutured at once. Another form of recto-urethral fistula occurs usually during the first week after operation. The cause of this is the necrosis of the rectal wall due to a thrombosis from traumatism. I have had one such case where an opening about the size of a number 12 French catheter persisted. Ten years ago I had one other case caused by the passage of a rectal tube through the rectal wall into the perineal wound. Young reports two cases breaking down after enema. Recto-urethral fistulæ will hardly ever occur in Young's prostatectomy if the levator ani muscles are brought together, so as to afford the normal support and protection to the rectal wall. It is only necessary after exposing the posterior surface of the prostate to examine the anterior wall of the rectum with the finger in the rectum to see how thin this tissue is; to realize the amount of care *it is* necessary to exercise.

Since having this complication we have never permitted

the use of a rectal tube or enema on any *perineal* cases. There are two methods of closing the fistula and they both aim at closure of the rectal wound. If one can get either the rectal wound or the urethral wound to heal, of course you can heal the fistula; the urine flowing over the sutures is the complication that causes the infection of the sutures. The methods of obviating this are first, by dissecting between the rectum and the urethra, closing the rectal wall by catgut sutures, after first freshening the edges of the opening, then performing a suprapubic cystotomy so the urine will not escape through the urethra. The suprapubic drainage is kept up for about ten days and the bowels are not allowed to move for a week. The other method is that brought forward by the late Dr. Alexander in which he reports twelve cases successfully treated by the following method; a short description of the operation is as follows: A careful dissection is made between the rectal and urethral walls as in the other method and the rectal wall is sutured by two rows of sutures. A triangular piece of gauze of about six thicknesses is filled with a 10 per cent. solution of iodoform and vaseline, this is then applied over the anterior surface of the rectal wound extending to its highest point. The vaseline gauze protects the rectal wound from urinary infection. As the urine escapes from the urethral opening it flows over the vaseline covered gauze in the way water runs off a duck's back. This one simple means undoubtedly simplifies the treatment of this most distressing complication.

The deposition of calculi in the bladder or prostatic urethra occurs and those cases which have previously had vesical calculi are most liable to this complication. We have had one case which had a calculus form in the remains of the prostatic urethra. This patient was operated and a silk traction suture was found that was the nidus of the calculus. He made a perfect recovery and we have never used anything but absorbable suture since even for traction in these cases. We have had one case of bladder calculus

following prostatectomy, discovered one year after operation—the stone was crushed and evacuated; the patient has had no recurrence and is well at this time.

Epididymitis is not an uncommon complication and some operators have gone so far as to advocate section of the vas to prevent its occurrence. We have had several cases but they have all been mild, recovering readily under local treatment and support of the affected organ. I have, however, had one very severe infection, this occurred after suprapubic prostatectomy. This patient had a very severe colon infection of the bladder. The epididymitis which developed was followed by a large hydrocele, within three days the fluid in the tunica vaginalis became purulent and at operation the tunica vaginalis was found filled with stinking pus of fecal odor. The patient was about his room in six days and made an uninterrupted recovery.

We have noted that some of our cases have had pain in the urethral canal during the first passage of urine through the normal channel after prostatectomy. In several of these patients the passage of urine has been followed by a typical urethral chill and high temperature. All the cases presenting this latter symptom have had badly infected bladders before operation. It is probable that the first passage of the infected urine through the unhealed urethra causes sufficient traumatism and consequent absorption to produce this condition.

We have had two cases of perineal prostatectomy in which there was a recurrence of obstruction. Care was taken in both cases at the time of operation to be sure every palpable portion of the prostatic growth was removed—one patient had less than an ounce of residual urine immediately after operation, after several years this gradually increased to from 4 to 6 ounces and six years after the prostatectomy he developed complete retention. Cystoscopic examination showed no intravesical growth, but a median bar could be made out. Operative removal of the obstructing bar was

followed by good recovery. The second case, operated on five years ago, was never completely relieved of residual urine, having 3 or 4 ounces after perineal prostatectomy. This patient before operation had had an enormously large flabby bladder with from 16 to 18 ounces residual urine. The cystoscope showed a left lateral lobe projecting into the bladder but no right lateral lobe, rectal examination revealed no prostatic tissue. A suprapubic operation was performed and a mass 4 cm. in diameter was removed. This had a dense fibrous capsule, with glandular tissue in the centre that on section squirted out the milky secretion that is seen in prostatic tissue. My explanation is that a small portion of prostatic tissue became surrounded with connective tissue and started to grow, thereby causing the obstruction. No evidence of malignancy on section of either of these prostates was seen. Unfortunately the second case died four weeks after operation from angina pectoris. He was to have left the hospital in a few days, being able to void his urine through the normal channel, although the suprapubic wound was unhealed.

There is probably no operation in surgery that is productive to the patient of more happiness and comfort in the majority of cases than is a properly performed prostatectomy. But I want to emphasize the great importance of both the *pre-operative* and *postoperative care of these patients*. A careful cystoscopic examination will reveal to the surgeon any complication and will often lead him to a different course of pre-operative treatment than if this examination had not been made. It is possible to cystoscope 20 out of every 21 cases of prostatic hypertrophy, and I feel convinced that it should always be done when possible, before any attempt of removal of the gland is made for the reason I have just spoken of, and for the great assistance it is in allowing a correct diagnosis of the intravesical prostate to be made, which cannot be made by rectal examination, thereby enabling the surgeon to *choose* the *operation best*

suited to the *individual* case. I believe there is nothing that allows Young to publish his successful results from perineal prostatectomy, more than the careful pre-operative and postoperative treatment his cases get; and my only criticism of him is that he has not brought this point forward enough, as any ordinary man reading his work would conclude that it is the simplest operation in the world and all the patients go right along to recovery without any after-treatment at all.

PROSTATECTOMY, WITH SPECIAL REFERENCE TO THE SEQUELS

By James E. Moore, M.D.
Minneapolis, Minn.

When we first began to perform prostatectomies, we usually did the suprapubic operation and only removed the projecting portion of the prostate. The operation was blind, bloody, and unsatisfactory, and the mortality rate was high. The immediate results were sometimes satisfactory, but a return of the obstruction was not uncommon. Under these conditions, the operation was not a popular one. The present popularity of prostatectomy began with the development of the perineal operation, which was a complete operation, was followed by better and permanent results, and was accompanied by a lower mortality rate. For a time this operation was very popular, and the journals were filled with reports of successful results. Had the unsuccessful results been as faithfully reported, the operation never would have become so popular. At the present time perineal prostatectomy in capable hands, and in properly selected cases, is a life-saving and conservative operation, and is the first choice of many of our best surgeons.

After the advantages of a complete enucleation of the gland had been demonstrated by the perineal operation, it was found that the gland could be readily enucleated through the suprapubic opening, and it is now the most popular operation. Even after the upper operation had become quite popular, its mortality rate was considerably

higher than that of the lower operation. At the present time the mortality rate of the two operations is practically the same, and is naturally lower than it was during the period of development. I was an early and enthusiastic advocate of the lower operation, but as time has gone by and as the technique of the upper operation has become developed, I have found myself resorting more and more frequently to the latter operation, and this has been the general trend of surgeons. No surgeon should be wedded to one operation, but should be proficient in both so that he can fit the operation to the patient, and not the patient to the operation. The popularity of the upper operation is largely due to the fact that it is the easier operation to perform. Its enthusiastic advocates claim that there are fewer complications and sequels, and that convalescence is shorter and more satisfactory, but these are still moot points.

When the possibilities of complete prostatectomy were realized, the operation was soon being overdone by many surgeons, and was undertaken by many would-be surgeons. The reaction was natural and wholesome, so that now expert operators are more conservative, and novices have learned that it is not a good operation to experiment with. A few years ago, one enthusiast said that the operation was so simple and easy that it should be relegated to minor surgery, but I am sure that all my hearers will agree with me that it is a serious major operation, and that it should not be undertaken lightly by the experienced surgeon, and should never be undertaken by the occasional operator.

It would be a waste of your valuable time to describe the technique of these operations, because it has been so often and so well written; but there is one practical point in the technique of the upper operation which I have practised and taught to my students for a number of years, to which I wish to call your attention. Most writers recommend that after the suprapubic opening is completed and

the operator is ready to attack the gland, he begins by cutting or tearing through the mucous membrane of the base of the bladder over the most prominent part of the enlargement. I have found it much easier and quicker to force the point of the index finger into the internal meatus until the mucous lining breaks, when the finger can be readily passed through this break and the gland enucleated. In this way the gland can be enucleated nearly as quickly as the cut could be located and made in the mucous membrane, and with much less hemorrhage. I can heartily recommend this little maneuver. It was original with me, but others have also discovered it. Dr. L. L. McArthur, of Chicago, published the first description of it.

The general practitioner should be interested in prostatectomy and should be familiar with its possibilities, its indications and contra-indications, for it is usually to him that the patient first goes for relief. Conservatism should be the watchword in these cases, but it is not conservatism to postpone operation until organic changes have taken place in the bladder and kidneys. Every general practitioner should fully realize that when he is called to relieve a patient from retention of urine due to an enlarged prostate, that he is facing a grave responsibility. Up to this time the patient may have had little or no suffering, but will have been inconvenienced by being obliged to get up at night to urinate. If the bladder is emptied aseptically at this time, the patient may go on indefinitely without serious trouble, but should the doctor through carelessness or by use of a dirty catheter, infect this bladder, the patient is immediately in a serious condition, which may end in death in spite of all human agencies.

Prostatectomy is too grave an operation to recommend simply because the patient has an enlarged prostate which is causing him some trouble. An enlarged prostate is very easy to diagnosticate, and should not be overlooked by anyone. The general practitioner, when clean and careful,

can with propriety resort to an occasional catheterization, but when its repeated use is called for, he should take this as a positive indication for prostatectomy. At the present day, a patient should never be introduced into catheter life without first having had the advantages of prostatectomy urged upon him, for the average length of catheter life is not over four years, and if every patient were to have a prostatectomy performed when he begins to have serious trouble, the average length of life would be very much longer than this.

Old age is not of itself a contra-indication for the operation, because many successful operations have been performed upon patients well up in the eighties. When a patient has not been properly advised, or has refused to accept of good advice and has drifted along until there is extensive infection of his bladder, with possibly infected kidneys, he is not a choice subject for prostatectomy; but without operation he will surely be a great sufferer, and will live but a short time, so it would be wrong to deny him the benefits of surgery. In such cases, suprapubic drainage can be safely established under local anesthesia, which will afford wonderful relief, and quite frequently the patient will improve so much after this that a prostatectomy may become advisable.

Prostatectomy even in suitable cases is not always satisfactory, because of sequels which make the patient feel that he is little better off than before the operation, and occasionally he is worse after the operation than he was before. Not infrequently a patient who has been operated upon and discharged by the surgeon in a seemingly satisfactory condition, comes back to the family doctor suffering from some sequel that makes his life miserable.

When a comparatively young man has trouble enough with his prostate to induce him to consider prostatectomy, the effect it will have upon his sexual powers is a very important question. It is quite customary in reporting results

from prostatectomy to state that the sexual function is unimpaired. We know that this is a truthful statement in many cases, but every observing surgeon knows that there are many cases where this function is either greatly impaired or totally destroyed by the operation. When the ejaculatory ducts are destroyed, as they usually are, the patient is necessarily sterile, which is a matter of comparatively little importance, for most of these patients are sterile before operation, but unfortunately many of them are impotent after prostatectomy. It is difficult to get at the truth in this matter, for the patient considers his condition a disgrace rather than a misfortune, and is not disposed to talk about it. Very naturally, however, he will not recommend the operation to his friends.

The fact that prostatectomy does not always cause impotence, proves that the loss of the gland is not the cause of this unfortunate sequel. The destruction of the ejaculatory ducts cannot be the cause, else impotence would be the rule instead of the exception. Until we have learned just what it is that causes impotence after this operation, it is impossible to prevent it. It is rational, however, to conclude that inasmuch as erection is due to a reflex stimulus, the damage must be due to an injury to the nerve supply. When we take into consideration the fact that at best prostatectomy is a rough and rather unsurgical operation, performed upon parts highly organized and with a most delicate and sensitive nerve supply, the marvel is that impotence does not always follow.

Gangrene of the bladder is an occasional sequel. I have had one case of this kind within a year. A suprapubic operation was easily and quickly performed, and the patient did very well for four days, when his pulse began to go up, and he soon died. The bowel was not injured, but the whole base of his bladder was gangrenous. The possibility of this sequel should be remembered, and unnecessary bruising and tearing should be avoided. In this way the

danger of gangrene will be reduced to the minimum, but the probability is that it will occur occasionally in spite of every precaution.

Every surgeon learns to search the bladder carefully for stone at the time of the operation, because many cases are on record where stones were left which necessitated a second operation for their removal. There is no doubt but that stones do sometimes form in the bladder after the operation, for which the operator should not be held responsible. Doubtless fragments of the prostate or clots of blood act as a nucleus around which a stone may form. That they may form quickly I am convinced from the following experience. I performed a suprapubic prostatectomy, removing a very large prostate through a badly infected bladder. Owing to the condition, I thought of the possibility of stone, and explored the bladder most carefully, both with fingers and instruments, and found no stones. The patient had been bedfast for some time before the operation, but made a very rapid convalescence and soon resumed his business, being, as he stated, in perfect health. In much less than a year, but just how many months after the operation I do not know, he came to my office stating that he was having pain and frequent urination. I suspected stone, and advised him to go to the hospital for examination. This suggestion did not seem to meet with his approval, for I did not see him again. Some time afterward I learned that he came under the care of another surgeon, who removed a large stone from his bladder. This surgeon informs me that the patient came to him suffering from an abscess in the abdominal wall at the seat of the scar, and that the presence of the stone was not known until found when the abscess was opened. The stone was a large one, but I am confident that it must have formed after the operation, because I searched so carefully for it at the time of my operation, and because the patient was so thoroughly relieved by the operation.

This patient was operated upon at the University Hospital by one of the staff. The perineal operation was performed, and a very large prostate removed. The opening required was so large that it caused the operator some uneasiness, but it afforded ample opportunity to examine the bladder, which was carefully done. The patient, although old and quite feeble, made a prompt recovery and soon began to void urine naturally. When he was about ready to go home, he reported that he had passed two stones through the urethra. The stones resembled medium-sized gall-stones, and were facetted. Before passing the stones he had been perfectly comfortable, but this can be accounted for from the fact that they were closely packed in a pocket.

Careful search for stone should be made after every prostatectomy, for they are so often present and they should not be overlooked. A skiagraph should be taken before every operation, which will demonstrate the presence of all stones, whether pocketed or not. Before closing the wound, the bladder should be thoroughly emptied of all detritus, and later all blood clots should be removed.

In early cases of prostatism, where the obstruction is not too great and the cystitis not too severe, the cystoscope is very helpful. Stones can be detected, the condition of the mucous membrane ascertained, and the ureters catheterized. In older cases, however, the cystoscope is liable to do more harm than good. The greater enlargement makes the introduction more difficult and painful, and elevates the beak of the instrument so that the ureters cannot be seen. Even if they could be exposed, their catheterization through a highly septic bladder is an unwarrantable procedure.

A few years ago, urinary fistula were not an uncommon sequel, but with our present technique this is very rare. A fistula is most likely to occur when the cystitis is so severe that liberal and sometimes protracted drainage is an essen-

tial part of the treatment. With a reasonably clean bladder, the present trend of surgical technique is toward a more thorough closing of the wound, which shortens the convalescence and reduces the danger of fistula to the minimum.

In some instances, owing to the atony of the bladder before the operation, the patient is still obliged to use the catheter after the obstruction is entirely relieved. He has been greatly benefited, because a large-sized catheter can be passed without pain, but he naturally feels that the operation is not a perfect success. It is impossible to remedy this condition. It is wise to inform a patient who has led a catheter life for some time that possibly he may be obliged to continue the same after an operation, but it is safe to promise him that catheterization will be much easier and comparatively painless afterward.

Incontinence or dribbling is an occasional sequel after both operations, and is of course due to injury of the sphincter muscles, or their nerve supply. The sphincter at the neck of the bladder is always stretched and more or less injured by the upper operation, and special care should be exercised during this operation not to tear it. In the lower operation, the sphincter of the bladder is not in so much danger, but the accelerator urinæ muscle about the membranous urethra, which has an important sphincter action, is very liable to injury. To avoid this, entrance into the urethra should be made at the apex of the prostate, through the prostatic urethra. Incontinence is the sequel which makes the patient feel that the operation has done more harm than good. He forgets that he has been relieved from pain, and thinks only of his present affliction, which makes him a nuisance to himself, and to everyone around him. This is a most distressing sequel, and every precaution should be exercised to prevent it, for it is practically incurable when once established.

In conclusion the writer wishes to state that he is an

optimist and believes that the present day prostatectomy is one of the most beneficial operations at our command, but he feels that the number of failures and sequels are too numerous, and this leads to the question if less radical measures may not be better; such as removing the middle lobe by instrumental means, as suggested by Dr. Young, or of the removal of the middle lobe and stretching the prostatic urethra through a suprapubic opening, as practised by Siter of Philadelphia. Siter's suggestion is surely worthy of consideration, because his large experience has led him to conclude that dilatation is accompanied by practically no complications and sequels, and is followed by most satisfactory results.

DISCUSSION ON THE PAPERS OF DRS. HAGNER AND MOORE

Dr. William D. Haggard. of Nashville.—Mr. President: In reference to the control of hemorrhage in cases of prostatectomy, it is one of the most difficult things we have to contend with at times, and I want to speak of a simple device which proved useful to me in two instances where the hemorrhage at the time of the operation was considerable. We simply took a pack of gauze and put it in the capsule with a long handled forceps, holding the gauze from protruding through the opening with an elastic bandage. Hemorrhage was a postoperative complication in two cases, and this device proved successful. It was recommended by Stillman, of Denver, This is an extemporaneous way of controlling hemorrhage. I think Dr. Hagner's plan is excellent, but where the practitioner is called hurriedly and the patient is bleeding after operation, it seems to me that this is a simple device to control hemorrhage in an emergency.

Dr. Hagner (closing the discussion on his part).—There has not been very much discussion; but I would like to make a few remarks on the paper of Dr. Moore. He speaks of the ease of diagnosis in prostatic hypertrophy. I beg to differ with him: as sometimes the rectal examination shows no enlargement of the prostate and yet a man may have complete

retention, due to the intravesical change in the gland, and the cystoscope can be used to advantage in the diagnosis of these cases. I have in mind three cases that were operated on, their prostates removed, and the patients not benefited one bit by the operation. And why? Because none of the cases suffered from prostatic hypertrophy with obstruction, yet they had retention and some palpable enlargement of the gland. They all had locomotor ataxia, this has occurred not only to me but to colleagues of mine who do genito-urinary work. It is easy with the cystoscope to make a diagnosis in these cases, and even cases of locomotor ataxia are at times first diagnosticated from the vesical symptoms; on cystoscopic examination you find no intravesical prostate. The cut-off muscle is the point of obstruction, and you can cystoscope the whole urethra, a thing you cannot do in prostatic hypertrophy.

One case I operated on had complete regeneration of the prostate after operation. A suprapubic prostatectomy was done on this man, and the prostate, as far as we could tell was absolutely removed, both by putting the finger in the rectum and feeling no tissue left between the examining finger and intravesical prostate; yet in six months this man had as large a prostate almost as he had before operation. Examination of the prostatic tissue removed showed no malignancy. He has been completely relieved. It is now two years since the operation was done, and he has no return of obstruction. I believe in these cases, the prostate is flattened out against the capsule by pressure of the adenomatous mass, and on removal of the adenoma the prostate takes on its normal characteristics again, although at time of operation no prostatic tissue can be demonstrated. This patient has a normal prostate on examination, no residual urine, and has copulation with ejaculation of normal seminal fluid.

Dr. Moore spoke of the dangers of the cystoscope in these cases. The danger depends entirely upon the experience and dexterity of the examiner. If a man does not know how to use the cystoscope, it is dangerous. If he does, there is no danger at all.

So far as the choice of operation is concerned, I used to be wedded to the perineal route. I now do more operations by the suprapubic than by the perineal route, and there is no question in my mind that we are surer of better functional results from the suprapubic than from the perineal operation.

We do not see incontinence following the suprapubic operation, yet certain prostates can be removed more easily perineally than suprapubically. Those are the small prostates. Where you cystoscope and find a large intravesical enlargement, this prostate is easily removed by a suprapubic operation.

There are cases in which you cannot tell the nature of the intravesical growth without cystoscopic examination. You cannot feel the intravesical growth in the bladder and tell in which direction it extends or the outline of it.

Dr. Moore (closing).—I was led to write my paper from the fact that in talking with my colleagues I find they have had the same troubles that I have had. At first, when I had unpleasant sequelæ following operations of this kind, I felt the fault was mine, because nothing but good results had been published. I interviewed other operators, compared results with them, and found that while they had the same troubles that I had had, they did not publish them. We should be honest with ourselves in the interest of surgery and in the interest of humanity and more frequently state and publish our failures. We profit more sometimes by reporting our failures than by our successes.

As to the danger of the cystoscope, it is dangerous for an unskilled man to use it, and there are times when it would be safer to do a suprapubic cystotomy under local anesthesia than it would be to introduce the cystoscope into the bladder. Take an old thickened bladder, profoundly septic, with bad kidneys accompanying it, and it is a dangerous thing for an unskilled man to introduce a cystoscope, and if he succeeded in introducing it he would see nothing. There is no man who believes more in the use of the cystoscope than myself. The cystoscope has a place, but there are places where it is not helpful. With a highly septic bladder ureteral catheterization is an unwarrantable procedure.

OPERATION FOR FLAT-FOOT

REPORT OF AN INTERESTING AND SUCCESSFUL OPERATION ON A TRAUMATIC CASE

By W. P. Carr, M.D.
Washington, D. C.

Sawing through the os calcis, between the ankle-joint and the attachment of the tendo Achillis, slipping the sawn portion of bone downward three-fourths of an inch, and nailing it there, is an operation not difficult nor dangerous.

It gives a good arch to a previously flat-foot, a good heel to support the main weight of the body, and, in the one case in which I tried it, gave such excellent results that I feel justified in reporting it to this Association.

I do not know whether the operation is original, or whether it has been done before, nor whether it would be useful in gradually acquired or congenital cases.

It does, however, give so firm a heel and so good an arch that I hope it may prove useful in any extreme case of pes planus.

My case is briefly as follows:

J. E. V., white, male, aged thirty-seven years; electrician; fell from a scaffold in March, 1910, crushing both heels.

I saw him first three years later. He walked with difficulty with the aid of two canes, was unable to do any work, and suffered great pain when he walked more than a few hundred yards, or when he stood on his feet.

He was wearing steel arches, in both shoes, specially made from casts of his feet, and thought they helped him a little. He was very anxious to have something done.

Upon examination I found both feet unusually long, slender, weak, and perfectly flat. There was absolutely no arch when he stood up, and even when sitting with no weight upon his feet, a ruler laid on the sole touched every point from toe to heel.

The accompanying radiagrams, taken shortly after his injury, and three years later, show the conditions very well.

I proposed the operation, that was later done, as the only thing that I thought offered any chance of relief and with a hope, but no promise of benefit. The operation was readily accepted and was done at the Emergency Hospital, April 3, 1912.

A curved incision three inches long was made behind the outer maleolus down to the os calcis, which was easily exposed by slight dissection, and divided close to the ankle-joint with a modified Wyeth saw.

I know no other instrument with which this could be easily done. It would be difficult to get a Gigli saw around the bone. But with Wyeth's saw, or my modification of it, the division of the bone is easy. The divided posterior part of the os calcis was easily slipped down three-fourths of an inch on the left foot; but on the right this could not be done until the tendo Achillis had been obliquely divided and lengthened.

This was readily done through the same incision used for sawing the bone.

The sawn bone was nailed in its new position through a half-inch incision over the heel with an ordinary wire nail, two and one-half inches long, and the improvement in the shape of the foot noticed at once. A very good arch was formed.

Both feet were put in casts in extension. Primary union

FIG. 1.—Left foot before operation. Note the complete lack of arch, on both dorsal and plantar surfaces, and lack of heel.

FIG. 2.—Left foot six weeks after operation. Note the improved arch and heel.

resulted, and in a month all the tenderness had disappeared, and the casts were removed, but the patient was not allowed to walk until six weeks had elapsed. He was then able to walk much better than before the operation, and has continued to improve. He lives two miles from his place of work and now walks in and out every day. He walked two miles a few days ago, carrying a heavy load of books without pain or discomfort, and is greatly pleased with the result of the operation.

The nails were removed five months after the operation as they caused some pressure on the shoes.

Sliding the heel downward in this way not only gives a good arch and a firm heel, and takes the pressure off the tender part of the soles, but also puts a greater tension upon the lax plantar ligaments; and tends in that way to preserve the arch. This tension may be increased by sawing through the bone somewhat obliquely, making the upper part of the saw cut closer to the ankle-joint and the lower part of the saw cut closer to extremity of the heel, so that the sawn bone in being pushed downward will also be forced backward. But this must be done at the expense of the weight-bearing surface of the new heel, and sufficient tension on the plantar ligaments will usually occur from simply forcing the sawn fragment downward.

The question is whether, in gradually acquired cases, the new-formed arch will last, or whether the same conditions which produced the flat-foot will not reproduce it. Still there could hardly have been a weaker or more unfavorable pair of feet for operation than my patient had and he is showing no signs of relapse after walking for six months an average of three or four miles a day.

In this case it is true that the flatness of the foot was largely due to a traumatic displacement of the heel, but as will be seen in the skiagrams there was also relaxation of the plantar ligaments and faulty moulding of the tarsal bones, that with the long, slender, weak feet make the con-

dition almost identical with gradually acquired pes planus. And I am inclined to believe that the giving of a firm projecting heel and taking the pressure off the plantar nerves and vessels have had much to do with the good result that these factors would equally obtain in any severe case of flat-foot. Most cases can probably be satisfactorily treated by moulding the feet forcibly and retaining them in proper position with plaster casts and afterward with steel springs. But for those not improved by such treatment I would recommend a trial of this operation under very strict asepsis.

DISCUSSION

Dr. W. P. Matthews, of Richmond, Va.—It seems to me, that the plan Dr. Carr used in sawing through the os calcis was the most important part of the work, judging from the skiagram showing the piece of bone nailed and put back again in its former position. It is certainly not the operation for flat-foot except in traumatic cases where there is a fracture of the bones and an effort is made to try to replace the fracture.

There is one special point I want to make, and it is this: The profession at large are very remiss in the treatment of flat-foot. The use of an arch supporter in a case like this is about the worst thing one can use except in traumatic cases. Personally, I have not used an arch supporter for the past ten years. In doing hospital work at Richmond I have put the foot in proper position, and with proper gymnastics strengthened the muscles, tendon, and fascia, and put them back into position. This operation is quite as serviceable, except in fracture of the bone.

Dr. Carr (closing).—I do not recommend this operation for many cases, but I have seen some cases of flat-foot not improved under treatment by the usual orthopedic means, and if I had such cases, I would try this operation. If we give a man a good firm heel, it does not matter so much what is the condition of the rest of his foot. If we should cut off the rest of foot and leave the heel, he could walk fairly well. That is the important factor in this operation.

A CHEEK DEFECT AND ITS REPAIR BY PLASTIC OPERATION: REPORT OF CASE

By John Staige Davis, M.D.
Baltimore, Maryland

INTRODUCTION

Plastic surgery is attempted by almost every one who undertakes surgical work, and I do not know of any class of cases which is more frequently botched.

The scope of this branch of surgery is very broad and includes nearly every region of the body.

A thorough general surgical training is necessary before this work can be properly done. Ingenuity, patience, and constant personal supervision are required. The post-operative treatment is of the greatest importance.

An accurate knowledge of the vitality, recuperative power, and resistance of normal tissues, and also tissues infiltrated with scar tissue, is essential. Wound healing must be understood, and especially the treatment of granulating surfaces.

It is seldom that any two cases are exactly alike, and each deformity and wound is a separate study.

The results, in many instances, are slow in developing, the process being one of building a little here and a little there. It is difficult surgery, and the best results can only be obtained by surgeons who are constantly doing this work.

The following case was of considerable interest to me, and, as I was unable to find in the TRANSACTIONS of the Association any mention of a similar one, I thought it might be worth while to bring it to your attention.

HISTORY OF CASE

The patient was referred to me for treatment by Dr. John M. T. Finney. Admitted to the Union Protestant Infirmary, January 25, 1912.

Diagnosis. Large defect involving entire thickness of the right cheek. Typhoid complication.

Treatment. Repair with a double-faced skin and fat flap from the arm.

Clinical History. White, male, aged sixteen years; school boy.

Family and Personal History. Unimportant.

Present Illness. The patient said that in February, 1910, he had a severe attack of typhoid fever, and was in bed about ten weeks. While he was in a comatose condition a small ulcer appeared on the inside of the right cheek, which spread and finally destroyed the entire thickness of the cheek. This was evidently cancrum oris, which, as you know, occasionally occurs as a typhoid complication.

I am unable to give an accurate account of the development and course of this unusual complication, as the physician who attended him during the attack has ignored my request for this information.

Physical Examination. Negative, except as noted below. There was a circular, funnel-shaped opening involving the entire thickness of the right cheek. The external diameter was 6.3 cm., and the internal was 3.8 cm. The thickness of the posterior wall was 4.4 cm. The walls of the defect were made up of very dense scar tissue of woody hardness. The scar tissue also involved the adjacent soft parts of the cheek. The defect extended from the level

of the hard palate to the floor of the mouth, and from the ramus of the jaw to within 1.3 cm. of the angle of the mouth. Posteriorly, a thick column of scar tissue encroached upon the oral cavity, and this, with a smaller band anteriorly, seemed to bind the jaws together (Fig. 1).

Both the upper and lower jaw bones on the right side had evidently been involved in the destructive process, and were covered with dense scar tissue which was continuous with the walls of the defect. The parotid duct could not be located. All the teeth were missing on the right side, excepting one or two incisors. The tongue, on this side, was closely adherent to the body of the lower jaw and along the floor of the defect to such an extent that, of the right side of the tongue, only the tip could be moved.

The patient was unable to open his mouth even with the greatest effort. This condition seemed due to the scar tissue, and not to any trouble with the joints, as a certain amount of joint movement could be demonstrated. All of the teeth were in bad condition. Articulation was very indistinct, and talking was impossible unless the opening was plugged with a dressing. The patient was obliged to force his food with his finger, back behind the teeth on the left side, and was unable to feed himself through the defect, as the unequal movements of the tongue forced the food back through the opening.

An idea of the ghastly deformity can be obtained from the plates, and it is easy to imagine what a source of misery and trouble it was to the patient.

When we consider the repair of a large defect involving the whole thickness of the cheek, it presents a number of difficulties.

After a careful study of the case I came to the conclusion that a flap with a broad pedicle presented the greatest promise of success, as a good blood supply was imperative to combat infection, and to nourish the flap until the new vessels from the surrounding tissues could take care of it.

It was necessary that this flap should fulfill several conditions: (1) It should not contract appreciably after being implanted; (2) it should have enough thickness to fill the defect without causing a depressed area after healing was complete; and (3) it should be formed of soft tissue (preferably fat with whole thickness skin on both sides), which would conform in appearance to the surrounding skin externally, and take the place of the mucous membrane in the mouth.

In order to avoid any further mutilation of the face or neck I determined to utilize the right arm, as I was able to secure a flap from this region which would fulfill every requirement.

January 29, 1912. *Operation.* Nitrous oxide-oxygen anesthesia. A large pedunculated rectangular-shaped flap 7.5 x 16 cm., made up of whole thickness skin, with its subcutaneous fat, was raised from the outer side of the right arm. The base of the flap was in the mid-deltoid region. The flap was folded on itself and the distal end was sutured to the pedicle and underlying muscle. A few interrupted sutures were placed at intervals in the edges, thus bringing raw surface to raw surface, and forming a flap with a double thickness of fat within, and with whole thickness skin on front and back (Fig. 2). A number of small stab wounds were made in the flap to relieve congestion. The flap was then stretched by means of four sutures on a gauze-covered wire frame, to keep it flat, and to control the contraction. Dressed with moist salt gauze. The area from which the flap was raised was grafted immediately with Thiersch grafts from the thigh. Silver foil, rubberized mesh, and dry gauze dressings.

February 11. The flap was in excellent condition. There had been little shrinkage. The Thiersch grafts on the arm had taken in toto.

February 12 (fourteen days after the flap was formed). *Operation.* Ether anesthesia.

As much as possible of the scar tissue was removed from the sides and upper portion of the defect. This was attended with considerable difficulty and much bleeding. The tongue, which was adherent almost to its base, was freed and drawn to the left side, and an attempt was made to close the raw surface. Even after dissecting out the scar tissue bands the jaws could not be opened to any extent, and this was probably due to the great infiltration of the muscles with scar tissue.

The flap on the arm was then opened across its free end, and its edges freshened. The arm was raised into position and the flap was sutured into the defect. Catgut was used in the mouth and through the fat, and silk on the cheek. In this way the upper two-thirds of the defect was filled. The arm was then held by means of a plaster cast, which also included the chest, shoulder, and head. The flap was dressed with moist salt gauze.

The patient was placed on a Gatch bed and every effort was made to keep him comfortable. Continuous salt solution by rectum was commenced and kept up for several days. Constant attention was given to the toilet of the mouth. Only sterile water was given by mouth until the third day, when nasal feeding was begun and continued until the pedicle of the flap was amputated. The nasal feeding was not commenced earlier as vomitus would have been difficult to handle.

February 13. The patient began to complain of pain in the chest. The temperature rose to 102°, pulse 135, respiration 30. Examination showed in both axillæ areas of diminished resonance and suspicious tubular breathing, which was, to say the least, disquieting.

On the following morning, however, the temperature began to fall and all untoward symptoms disappeared. For the first forty-eight hours there was considerable discomfort complained of on account of the constrained position.

February 23 (eleven days after implantation). The circulation seemed well established from the cheek. The flap had healed nicely both inside and out. The cast was removed and under local anesthesia the pedicle was cut through close to the arm.

March 3. There had been very little shrinkage of the flap since the last note. The general condition of the patient was excellent (Fig. 3).

March 4 (eleven days after amputation of pedicle). *Operation.* Ether anesthesia.

The scar tissue was dissected out from the lower third of the defect and, after trimming and freshening the edges of the flap, it was sutured in so as to completely close the remainder of the opening.

March 18. The healing, both within the mouth and on the cheek, was very satisfactory, except for a small sinus in the lower anterior angle of the flap,which did not connect with the mouth.

The tongue could be moved freely. Articulation was plain, and the patient could feed himself with more satisfaction than before the flap was implanted. In spite of as thorough excision of scar tissue as could be undertaken and closure of the soft parts, a dense band had re-formed at the anterior edge of the flap, close to the angle of the mouth. This seemed largely responsible for the inability to open the jaws.

March 27. *Operation.* Ether anesthesia. An incision was made through the angle of the mouth back to the scar tissue band, which was then excised. The anterior edge of the flap was loosened and sutured to the mucous membrane. As much as possible of the remaining scar tissue was excised or divided, but the involvement of the deep tissues of the cheek did not allow much jaw movement. The angle of the mouth was closed. The jaws were held apart by a wooden wedge forced between the teeth.

April 4. Some progress had been made in opening the jaws by means of wedges, but this could not be forced on

Fig. 1.—Defect in cheek before operation. Note depth of posterior wall and extent of scar tissue involvement around the opening. The tongue can be seen adherent to the lower portion of the defect.

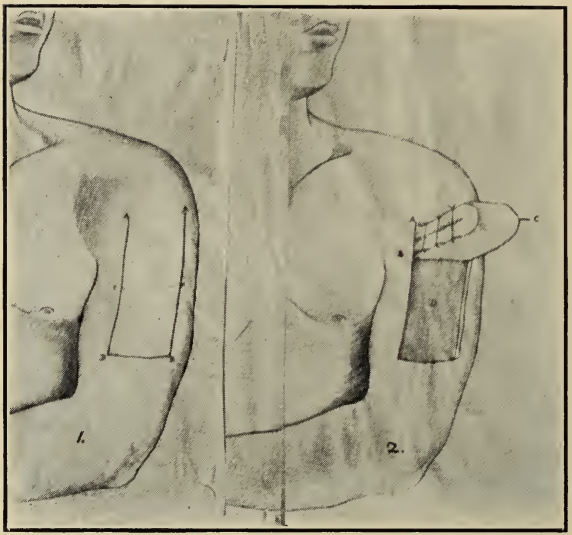

FIG. 2.—Schematic drawings showing method of formation of flap: 1, outline of flap; 2, the flap was folded on itself at "C." The distal end "B" was brought up and sutured to the pedicle and underlying muscle at "A." Several sutures can be seen holding the edges together and forming a flap with a double thickness of fat within, and whole thickness skin on front and back. The double-faced flap was held flat on a wire frame. It was not transplanted until two weeks later, in order not to disturb the healing process between the raw surfaces, and to allow for shrinkage and the adjustment of the circulation. "D," the area from which the flap was raised, was grafted immediately with Thiersch grafts from the thigh.

Fig. 3.—The flap healed into the upper portion of the cheek defect. Note the thickness of the flap and its excellent condition. Photograph was taken nine days after amputation of the pedicle from the arm.

Fig. 4.—Photograph taken December 2, 1912, six months after discharge. The flap is now level with the surrounding skin. The scar is less noticeable.

account of great soreness of the teeth. Injections of fibrolysin were begun in hopes that it might have some softening effect on the dense scar tissue, and these injections were continued daily until 26 doses had been given. No softening effect was noted. During the healing there had been a contraction of the scar tissue in some places around the flap, causing a depressed scar.

May 20. *Operation.* Ether anesthesia. The depressed scar was incised, and at the same time a further effort was made to loosen the jaws by dividing scar tissue, but with little success.

June 2. Patient discharged. *Condition.* General health excellent. The defect was entirely closed with a thick flap which was nearly level with the surrounding tissues. There was wonderful improvement in the appearance of the patient. The flap was in excellent condition. The skin was soft and pliable and of normal color. Within the mouth the skin was whitish and soft, and seemed to be gradually taking on the characteristics of the mucous membrane. It had united as satisfactorily to the surrounding tissues as had the external layer. The jaws could be opened so that the tip of the finger could be introduced between the incisor teeth, and there was considerable lateral motion. There was free motion of the tongue. The boy could talk much more plainly than when admitted, and the feeding process was simplified.

The courage and cheerfulness of the patient helped materially during the tedious treatment.

REMARKS

The general physical condition of the patient was of the utmost importance, and rest, fresh air, forced feeding and tonics were resorted to. In addition, particular attention was given to the cleanliness of the mouth, and the services of a dentist were obtained. Nasal feeding was inaugurated

after each operation involving the mouth cavity, and I wish to emphasize the importance of this method of feeding in similar cases, as feeding by mouth while the wound is fresh, adds materially to the chance of infection, especially where there is so much difficulty in keeping the mouth clean.

On several occasions systematic attempts were made after dividing or removing the scar tissue to force the jaws apart by means of mouth gags, wooden wedges, and screws, but they were only partially successful.

In a cursory glance through the literature I have not encountered just this method of utilizing the "flap from distant part principle," for closing a cheek defect.

The operations of Israel,[1] Hahn,[2] and Czerny,[3] are the only ones, as far as I can find, in which a portion of the same whole thickness pedunculated flap is utilized to close both the defect in the mucous membrane and also in the skin. Israel secured his flap from the neck, Hahn from the chest, and Czerny from the cheek and neck.

All methods of closing such defects are tedious in their accomplishment, and this method is no more so than the others, and has, I think, advantages which make it desirable.

By the method of treatment used in this case, the defect was filled with a thick flap of tissue with whole thickness skin on both sides. The circulation of the flap was assured before the transplantation was begun. Most of the shrinkage of the flap had taken place before it was transplanted. There was no unsightly scarring of the cheek or neck. The area from which the flap was raised was entirely healed by means of Thiersch grafts by the time the flap was ready for transplantation, and thus one chance of secondary infection was eliminated.

The only serious disadvantage of the method is the constrained position of the patient during the time the circu-

[1] Arch. f. klin. Chir., Berlin, 1887, Band xxxvi, S. 376.
[2] Verh. d. Deutsch. Gessellsch. f. Chir., 1887, Band i, S. 102.
[3] Beitr. z. klin. Chir., 1889, Band iv, S. 621.

lation from the cheek is entering the flap. This position apparently causes little discomfort after the first forty-eight hours. This patient did not even complain of soreness in the shoulder after the pedicle was amputated and the arm lowered to the side.

In a letter of recent date the patient says he is attending school and doing well. His appearance is so much improved that it causes him no concern. He can eat with comfort and pleasure and is able to talk much plainer than before operation (Fig. 4).

On the whole the result is very satisfactory, although there is still limitation of the jaw movement. Furthermore, and most important, is the fact that the patient is relieved of a hideous deformity, which would have prevented his living a comfortable, healthy life, and would probably have interfered with his obtaining lucrative employment.

DISCUSSION

Dr. J. M. T. Finney, of Baltimore.—I had occasion to see this case a short time before operation and also in the course of treatment, and the results are most satisfactory. In fact, they are rather better than the photograph indicates.

I want to emphasize the value of making use of this particular flap method for closing deformities about the head, face, and neck. I have had occasion to utilize it in one form or another on a number of occasions, in making new noses chiefly, but for one or two other purposes as well. It is not original at all, but it is a very valuable procedure. I refer to grafting the raw surface of the flap. I have done that in one case of the nose, where I had to make an outside covering for the nose. We turned up a flap such as this, grafted the under surface, thus securing a flap with skin on both sides of it for the nose, so that subsequent contraction, which is the trouble in these cases would be materially lessened.

Dr. Joseph Ransohoff, of Cincinnati.—This is one of the most brilliant cases we have had presented at this session of the Association, and Dr. Davis is to be congratulated on having secured so fine a result. But I really do not understand why in cases of this kind we should not use a flap from the neck.

I think the result probably would have been just as good, and the patient would not have been subjected to the constrained position for the length of time, such as we saw in the illustration. This is an excellent picture, but I saw an expression of misery on that face.

With regard to the operation upon the nose, of course there we would have to do it. We must put the arm up in that position. But, after all, it is the perfect result, so far as the surgeon is concerned, and the patient is thoroughly satisfied because he is able to speak. There is no saliva coming out. The cosmetic result in these plastic operations is not usually as satisfactory to the patient as it is to the physician. I wanted particularly to make these remarks because they lead to a story told of Dieffenbach, who was a master of plastic surgery. In his time he repaired a portion of the nose of a woman. He was thoroughly satisfied with the result, but she was not and she complained, when Dieffenbach said to her, "Madame, you seem to forget that it is a great deal easier to make a whole new man than a little bit of a nose."

Dr. W. P. Carr, of Washington, D. C.—I would like to mention a case I had with almost the same result as Dr. Davis obtained in his case, except the whole bridge gave way. This was an old man, aged seventy years, who had a cancer of the cheek. He went to a cancer specialist who endeavored to burn it out by numerous operations, and when I saw him he had a hole in his cheek so that you could look down in his nose, throat, and everywhere else. A colleague of mine tried an operation on him, and the flaps after getting well started to slough from their attachments, and after trying two or three times he asked me to try my hand at it. I think I did three operations, and finally with a double flap of skin which started about the clavicle, I got it pretty nearly closed in, with the exception of some little places. I was anxious to do one more operation, but he would not submit to it.

Dr. F. W. Parham, of New Orleans.—I have had one gratifying result in the case of a little girl who had lost the side of the cheek from cancrum oris extending back to the edge of the masseter muscle. In that case I turned up a flap from the neck with the skin in and sewed it there with the mouth wide open, so as to have sufficient flap. I grafted the outer surface, and the result was very satisfactory.

Dr. Charles H. Mayo, of Rochester, Minn.—While the foregoing paper was being read I was reminded of a method of

closure of cheek clefts reported by Dr. Bartlett. I tried his method on an elderly man on whom the cheek was removed for carcinoma. The plan is as follows: Split alongside the exposed tongue, turning one side up and the other (lower) down and suture it into the defect. At the end of ten days another operation is done splitting off the side of the tongue, about one-half inch of it, and closing it by sutures. This leaves a pliable mucosa to line the cheek on the inside. The plan worked out very nicely in this case. Grafting the raw surface of the tongue filled in the cheek. In these cancerous cases one-quarter of the tongue can be utilized without impairing the motility and speech.

Dr. Ernst Jonas, of St. Louis.—I have operated for a condition of this kind in the following case: The patient was an old man, operated on for cancer of the cheek. The mucous membrane of the mouth was removed by the hot iron method. Besides, the lymphatic glands below the jaw were removed. There was complete cure of the cancer two years after this removal of the mucous membrane; but because of the scar formation the man could not open his mouth well. I cut out the scar, took a flap from the cheek, turned the flap, and sewed the two parts directly over the raw surface of the flap turned down from the neck. This healed completely in ten days or two weeks; the pedicle of the flap was cut, and the man was completely cured. In that way skin grafting was not necessary.

Dr. Davis (closing).—I have already stated that I did not take the flap from the neck, as I was anxious to avoid further unsightly scarring. The operation of utilizing a portion of the tongue to close the defect, as advocated by Willard Bartlett, is familiar to me, but was impracticable in this case on account of the impossibility of opening the jaws. The age of a patient has considerable bearing on the type of operation chosen. It is always better in older patients to secure the flap from adjacent tissues, on account of the danger of pneumonia, from the constrained position necessary in utilizing a flap from a distant part. Cheek defects have often been closed by flaps from distant parts, but I have been unable to find in the literature a similar method of preparing the flap. The important point in the method reported here is, that a flap with whole thickness skin on both sides is fully prepared before transplantation. The healing between the surfaces of the flap is complete, the circulation is assured, and most of the shrinkage has taken place before implantation is attempted.

SUPPURATIVE PYLEPHLEBITIS

By Charles R. Robins, M.D.
Richmond, Va.

It is stated by Deaver on the authority of the researches of Pelligrini, D. F. Jones, and A. K. Gerster, that suppurative pylephlebitis or hepatic abscess occurs in from 1 to 2 per cent. of all case of appendicitis. Judging by my own records this percentage appears to be very high. My first case of suppurative pylephlebitis occurred in 1911, and this case presented such typical symptoms and was at the same time so remarkable that a somewhat detailed report may be of interest.

Private Records. Case No. 16,531 was seen by me at his home in the country on August 30, 1911. He was aged thirty-six years, white, single. Five days previously he had been taken with a violent pain in the abdomen, worse in the epigastrium, and with vomiting. On the next day he had a chill and his temperature rose to 103.5°, and the pain in his abdomen continued. He had been treated by starvation, elevation of head of bed, and rectal saline, and had become more comfortable, but continued to have a bad feeling in epigastrium.

On examination he was found to be a very stout man with a large collection of fat on the abdomen. His abdomen was distended throughout and on the right side there was considerable resistance, and near the anterior superior spine a hard mass of inflammatory exudate could be made out. A diagnosis of appendicular abscess with either gangrene

or rupture of appendix was made and the patient taken to the hospital the next morning. On admission his temperature was 99.8°, pulse 96, and respiration 24. The following day he was operated through a McBurney incision and the omentum found adherent over the mass with no adhesions to anterior abdominal wall. The abdomen was walled off with gauze sheets and adhesions of omentum released, revealing an abscess cavity containing about two ounces of foul black pus with the tip of a gangrenous appendix projecting into it. The pus was mopped out and examination of the appendix showed that its base was postcecal and very densely adherent. It was determined that its complete removal would be hazardous, so the gangrenous portion only was removed. The abscess cavity was drained with rubber tube and gauze and the wound partially closed. After the operation the patient was fairly comfortable, but his temperature rose to 102° as the daily maximum, with slight remissions, until seven days after the operation he had a chill and his temperature went to 103°. A leukocyte determination showed a total of 18,000; polymorphonuclears, 72 per cent. He then had one chill daily for three days, the temperature beginning to show marked remissions, and on the ninth day following the primary operation he was again anesthetized and an exploration made of the abscess cavity with the finger, and a small pocket of pus and a fecal concretion were found behind the cecum. This cavity was drained by a counter incision in the flank and a rubber tube carried through from the original wound to the counter opening. Following this the patient had two chills the same day, but the next day his temperature declined to normal. On this day his total leukocytes were 18,800; polymorphonuclears, 88 per cent. On the day following he had another chill and was given an injection of coli bacterins, 2,500,000, which was repeated on the following day.

The clinical picture at this time was as follows: He complained constantly of abdominal pain which was most

intense to the right and above his umbilicus, and at this point he was very tender. He also had griping pains through the abdomen that would come on in spells. No masses could be made out in the abdomen. His liver was somewhat enlarged and spleen was very much enlarged and could be easily palpated. He did not suffer from nausea and was able to take nourishment fairly well, but would often vomit when he had a chill. Defecation was rather regular and he would have from one to three movements a day which were often black in color. There was some cough which was at times annoying. Careful physical examinations of the chest were made by Dr. Manfred Call and a slight dulness was made out in the lower posterior aspect of the right chest, but exploratory puncture of this area and of the liver were negative and no abscess of the liver could be made out. A diagnosis of suppurative pylephlebitis was made and a gloomy prognosis was given. I then began the administration of Van Cott's formula of vaccines, and a careful leukocyte determination was made, at first each day and finally at frequent intervals. In a period of twenty days he had forty-one chills and during this period two doses of 2,500,000 colibacterines, and six doses of 1 c.c. of Van Cott's formula of vaccines were given. The chills would last from a few minutes to thirty-five minutes and were very violent and would be followed with drenching sweats which necessitated changing the bed clothes. The excursions of temperature were very marked, occasionally extending over as much as eleven degrees, from 105° to 94°. His leukocyte count remained fairly well balanced. His chills then became less frequent, occurring at intervals of from one to four days, but his temperature remained high, and he continued to suffer with violent pain to the right of and above the umbilicus. At the same time no mass could be made out. Finally on October 4, forty-three days after the operation, a right rectus exploration was made. There was a considerable amount of slightly red-tinged fluid in the abdomen;

the liver was somewhat enlarged but presented no evidence of abscess and was not adherent at any point. The gall-bladder was normal. The veins of the mesentery were enormously enlarged, especially those draining the appendiceal and cecal region. No abscess could be made out through this incision. The incision in the flank was enlarged and the entire space behind the ascending colon as far as the liver was opened by exploring with the finger. There was a great flow of black blood from the enlarged veins, but no abscess was found. All of these wounds were drained. After this Van Cott's vaccines were continued. There were seven chills with violent excursions and then for a period of nine days there were no chills and the temperature reduced until the daily excursion was from normal to 102°. His abdomen, which for some time had been distended with fluid, became even more distended and on several occasions it broke through at one of the points of drainage and discharged first some pus and then a large amount of clear serum which would continue to flow for some days. He continued in this way with improvements and relapses in his condition until November 29, ninety-nine days after his original operation, when he entered into a period where he had no chills and his temperature gradually subsided until by December 23, the highest temperature for the day would be 100°, but during this time his abdomen had become more and more distended. I was of the opinion that the veins had become thrombosed and the infection overcome, and was contemplating some operation to overcome the ascites when he suddenly became worse, and on December 31, I opened his abdomen in two places and found that the fluid had become purulent. He gradually sank and died on January 13, after an illness of one-hundred and fifty-two days. During this time he had seventy-five chills. An autopsy was refused and was not insisted upon.

The severity of the case, its extreme prolongation, and

the apparent recovery at one time make it most interesting. As to what effect was had from the administration of Van Cott's vaccine, I have not been able to definitely determine. In all twenty-eight doses were given. It seemed to me that it caused improvement. When first commenced the patient was in a very toxic condition and was delirious at times, but in a short while his mind became clear and remained so, notwithstanding the severity of his symptoms, until his last relapse. I could not see that there was any particular effect on the leukocyte count except that it remained fairly well balanced. In view of the fact that this malady is usually rapidly fatal and that no plan of treatment has yet effected a cure, I think that treatment along this line probably offers the only hope, and the apparent success at one time was encouraging.

In reviewing the literature in connection with this case I was somewhat surprised to find that only very slight references have been made to this condition in the journals. I found fairly complete descriptions in Deaver's *Appendicitis;* in the section on Appendicitis by McCosh, in the *American Practice of Surgery;* and in the latest edition of Strümpell; but the best description I found was that by Rolleston on *Diseases of the Liver.*

The most frequent cause is suppurative appendicitis, although it may be caused by other gastro-intestinal lesions of which gall-stones is the most important. The inflammation commences in the appendiceal vein and extends to the superior mesenteric, thence to the portal vein and the radicals in the liver. The vessel walls become swollen and softened and sometimes break down and the vein contains a mixture of pus, blood, and clots. The extent of the vein involved varies greatly. Multiple abscess of the liver naturally develop with great frequency, but cases have occurred in which the liver has not been affected.

The clinical picture presented is first of the primary disease, usually appendicitis, and secondly the develop-

ment of the pyemic state. Rigors are usually present at first and when these follow an appendicitis in which the abscess has been thoroughly drained, it is highly suggestive. The liver is uniformly enlarged and accompanied by pain and tenderness in the hepatic region. The spleen is usually enlarged due to the toxic state.

As to the question of diagnosis it must rest first on the causative disease, second on the development of the pyemic state, and lastly on the exclusion of other causes for the symptoms presented.

DISCUSSION

Dr. Joseph C. Bloodgood, of Baltimore.—It might be interesting if we could start a discussion on the secondary involvement of veins; thrombophlebitis or phlebitis without thrombosis in relation to the appendix, in the veins of the mesentery, with secondary involvement of the liver, is an unusual complication. I have had no experience with cases in which the diagnosis has been confirmed by operation. I have seen one case in which the clinical history was very much as in this case, in which the lesion began after an ischiorectal abscess, and in which apparently thrombosis and inflammation took place in the hemorrhoidal veins. At least, the man had an ischiorectal abscess, and when I saw him he gave a history of chills and fever, and had a very large liver and fluid in the peritoneal cavity. His total illness was something like eight weeks, and there was recovery. Perhaps Dr. Finney will remember a case where, after operation for appendicitis, many years ago, I remember helping him explore the abdomen, and undoubtedly in this case there was this complication because we found a very large liver, but as there was nothing to do we could not explore any more. I am inclined to think that was the complication. But the point I wish to bring out most in this discussion is a more critical investigation of our post-operative complications on part of the veins. I would not have arisen to discuss this paper if I really did not have something new to say about it. After introducing what someone has called Dr. Crile's magic nitrous oxide as the anesthetic, and giving small quantities of oil and glycerin as enemas

after operation, this complication, although rare, seemed to have disappeared. I came back after six weeks' vacation to St. Agnes' Hospital, and was told that there was an epidemic of phlebitis of the leg. I could not understand it, I investigated, and found out that those in charge of the hospital had investigated the cost of oil and glycerin and had decided it was not the part of economy to employ them in the ward cases. Without letting the residents in at first, whenever we ordered oil and glycerin enema of about 6 ounces, the patient got 2 quarts of soap and water. Some years ago, when I went over the cases of this complication in hernia and in appendicitis, I could not find a case in which there was not after operation a distention of the abdomen, and frequent enemas of this kind were given in the beginning of surgery. I think we have some members in the audience who have had personal experience with these enemas. Since giving up these large enemas and substituting oil and glycerin this epidemic has disappeared. I do not know of an observation which you can use as evidence pointing to the danger after operation of large enemas of soap and water. It does seem as if that was a very important thing.

Another interesting point is with reference to the chills and fever and the leukocytosis in thrombophlebitis. I do not think they can be looked upon as a sign of pus formation or an indication for operation. I have seen again and again chills and fever and high leukocytosis, and yet recovery. I have now a patient under my care who has had for twenty years following the birth of her first child recurrent attacks, sometimes at intervals of five years, or one year she will have chills and fever and swelling in one or both groins. On one occasion in coming from Alexandria, Egypt, to Naples, in Italy, she had an attack and was going to be isolated for bubonic plague on account of the swellings in the groins being so large. In these twenty years she has had five or six of these attacks, lasting five weeks or more, with chills, elevation of temperature, and leukocytosis. I saw her in her last attack. There was no suppuration, and she recovered. This is a good point to remember in the post-operative complications. It is not an indication for exploration. Rarely is there an indication for exploration, and rarely can we do anything for the suppurative type except in tubulation of the vein.

Dr. C. H. Mayo, of Rochester, Minn.—Tell us how to handle the oil and glycerin before you sit down.

Dr. Bloodgood.—I was so struck with this epidemic confirming my view that I want to speak of it. It was very suggestive. I have been giving now for over a year in all laparotomies oil and glycerin as a routine. These patients get oil and glycerin four hours after the operation, and they get oil and glycerin every six hours. I had it myself after an operation.

Dr. R. B. Hall, of Cincinnati.—How much do you order?

Dr. Bloodgood.—Three ounces of glycerin, and three ounces of olive oil, passed with a small catheter introduced, and the oil and glycerin allowed to run in through a funnel. The moment the patient says "I feel a discomfort," it is stopped. In the average patient most of the oil is retained. I will tell you my own personal experience. I had this oil and glycerin two or three times a day for three days after operation. Some of it was experimental, and I do not know whether I really needed it or not. As a rule, after 2 to 4 ounces were introduced, I would have a feeling of something moving in my abdomen, and after taking out the catheter I would pass oil and glycerin with a great deal of gas. It seems to me, that with the repeated doses of oil and glycerin per rectum, I have seen less distention and have shortened the period of gas pain more than by any other method I have used. In the first place, I make it a rule not to wait until they are uncomfortable to start with, and keep it up. It is for the relief of gas and not to move the bowels.

Dr. C. E. Caldwell, of Cincinnati.—What is the modus operandi of thrombosis after soap-suds enema?

Dr. Bloodgood.—Distention of the abdomen and direct trauma to the surrounding veins. I know that from the practical side. I lived in the hospital for six years and observed these things carefully. I went over every case in 1899 before I left the hospital. I read the histories of all of them, and there was not a single case in which there was thrombosis that did not get an enema, and those that did get thrombosis got more enemas than usual. My feeling is that the large enemas are dangerous and not as efficacious as ordinary oil and glycerin. There is only one objection, and that is it is more expensive.

Dr. Guy LeRoy Hunner, of Baltimore.—In line with this discussion on chills and fever and to appreciate what profound symptoms may sometimes arise from a comparatively slight local condition we have but to recall some pyelitis cases where apparently there is good drainage most of the time. I have

two cases in mind, one of which ran over a period of a year, at first having frequent chills and fever and pain in the side. She refused to let me wash the kidney until about a year was up. In that time she had rigors with decreasing frequency until they were a month apart, and then finally four months apart. She was congratulating herself she had got rid of them entirely, when one evening at a card party she had another one of the chills. After each of the attacks the urine became more turbid; but in the interim between attacks the urine was not very turbid and she was perfectly well. After two washings of the kidney I got rid of the colon bacillus infection and she never had any trouble after that.

Another case had a similar history. Both were postpuerperal cases. The second case ran for a period of four months, harboring a colon bacillus infection. I figured that for some reason the ureteral mucosa became swollen sufficiently to cause a retention and an increase of the infection.

I simply cite these two cases to show, if there are any bacteria pent up in the system, how small a cause may bring about these fevers and chills.

Dr. Robins (closing).—I reported this case because it was an unusual one. I narrated the procedures that were undertaken, because there was no postmortem examination, and I wanted to bring proof that the condition was as I diagnosticated it, an inflammation in the portal vein.

Another point is that I do not believe this condition occurs with the frequency that the books state. So far as I can recollect, without having gone over all the cases on which I have operated in detail, I have only had three such cases. In one, the patient died of multiple abscess of the liver. I had another case diagnosticated as pylephlebitis that died at the same time that this case I reported was in the hospital. That patient only lived about a week. I was satisfied from the symptoms that the condition was the same. How it is possible for a patient to live with an inflammation of the portal vein with the vein filled with pus and clots, for the long period that this patient lived, struck me as being remarkable. I am satisfied, however, that the condition was pylephlebitis and every other possible condition was eliminated.

A SIGN OF DIAGNOSTIC VALUE IN OBSCURE CASES OF CHRONIC APPENDICITIS ELICITED BY RECTAL PALPATION

By Francis Reder, M.D.
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It seems rather presumptuous in consideration of the enormous amount of work, and before so distinguished a body of men whose labors have thrown so much light upon this subject, to offer at this late date a "point" that may prove of value in establishing clinically an absolute diagnosis of the more obscure forms of chronic appendicitis. The group of cases that comprise this class constitute a chapter in themselves.

Chronic lesions of the appendix may be considered conveniently under two heads: Conditions where the chronic inflammatory process has involved the appendix with the formation of adhesions, and conditions where the chronic inflammatory process has been simply confined to the appendix with an absence of adhesions.

To the pathologist such a division is of very little interest. The clinician, however, who observes and studies his patient as a whole, may find some value in this simple classification.

A chronic appendiceal lesion complicated with adhesions is prone to give a more exaggerated clinical picture than the chronically inflamed appendix without adhesions. With so vague a symptom complex as most of these patients present, a clinician will hail with gratitude any sign or symptom that may prove an aid in arriving at a more definite interpretation of the cause for the existing condi-

tion. A chronically diseased appendix is a positive menace to the health of the patient.

Through the sympathetic nervous system its scroll of vexation is so far-reaching that it may agitate every organ in the abdominal cavity and cause it to masquerade under a mantel of symptoms so adroitly that any organ, though free from pathology, may become the recipient of an unjust accusation.

Pain in all morbid conditions is our greatest diagnostic asset. Through its scientific interpretation we expect to be guided into an avenue that will enable us to clinically establish, speedily and accurately as our ability will permit, a diagnosis.

The class of patients upon which the interest of this paper is centred is the one suffering from chronic appendicitis, presenting an obscure clinical picture. The class is a large one and usually embraces those in adult life.

These patients come to us, not immediately after they have become indisposed, but long thereafter; I may say weeks and months after much drugging at home and visits to many doctors, without any appreciable improvement. There is much of a sameness in their histories. Not sick enough to be in bed, not well enough to be at work. Upon rising in the morning they feel fairly good and strong. After two to four hours at work their strength and endurance begins to flag, they become fatigued and feel unfit to meet the requirements expected of them. Sleep is usually good, but it does not prove as refreshing as it formerly did. The appetite is variable, *i. e.*, they could eat heartily, but are afraid to, because it leaves them with a feeling of fullness, and frequently nausea. Usually a gassy feeling with distress, amounting in some instances to pain, follows. This pain is of a queer, heavy and prolonged nature, and is generally referred to the stomach or indefinitely through the bowels. Taking food moderately or not at all, according to the inclination, becomes a habit. By strenuously

observing a rigid diet regime, these patients can make themselves quite comfortable.

In most cases the bowels are very obstinate and frequent recourse must be had to laxatives. The general feeling of such patients is one of apathy.

In what condition do we find these patients when they come to us? Some of them are in such a miserable state that it is difficult to know where to begin with the clinical examination. These patients have recited their story so often to the different doctors they have visited and in turn have received such varied information about their condition, that out of the confused statements obtainable it is almost impossible to get a clear or concise history.

Many of them have drifted into a neuropathic state with an associated psychological condition that demands the most exhaustive examination to disclose the real cause. This is principally true of women.

Others give marked evidence of a slow toxemia, caused by the absorbtion of ptomains generated by bacteria in the intestinal tract, while some show an alarmingly low resisting power, frequently associated with a concomitant anemia. Ask these patients if they suffer pain, and if so, where, the majority will answer by placing the hand upon the region of the stomach and with a sweep pass it over the entire abdomen. When asked what treatment has given them the greatest relief the usual answer will be, "washing out the stomach and enemas."

Many of these patients come to us discouraged and with a heavy heart because they have been given to understand, after all treatment has been of no avail, with a recovery as remote as ever, that they are either neurotics, neurasthenics, or hypochondriacs. What does the clinical examination of such a patient reveal? From the vagueness of the history it can be inferred with an appreciable definiteness that the primary irritant must be somewhere in the gastro-intestinal tract.

It must be borne in mind that in a chronic condition, such as we have in these patients, a primary pathology having its seat in one organ, may bring out secondary conditions elsewhere. This secondary pathology may become independently established and cause a fusion of the symptoms without much change in the already existing clinical picture. Such a conglomerate precipitates additional difficulties in diagnosing the actual pathology. Even indefinite as the symptomatology appears that is presented by these patients, it should permit the elimination without difficulty of gastric neurosis, gall-bladder disease, ureteral calculus, and in women, disease of the adnexa.

On the other hand this blurred clinical picture will draw into the diagnostic field for consideration: atonic dilatation of the stomach, visceral ptosis, prolapse of the kidney, certain chronic forms of duodenal ulcer, and chronic appendicitis.

A thorough examination should readily eliminate from this picture atonic dilatation of the stomach, visceral ptosis, and prolapse of the kidney, leaving for contention certain chronic forms of duodenal ulcer and chronic appendicitis.

Can the surgeon, after an exhaustive examination of a patient presenting a clinical picture indicative of a chronic duodenal lesion, or a chronic appendix lesion, or both, but strongly wanting in the characteristic diagnostic points, say with certainty that his patient has the one or the other, or both? In some cases, perhaps, yes. In the greater number of cases, however, no!

When our "points" with which we are so familiar, and upon which we rely so much in arriving at a diagnosis, serve us negatively, and the number of cases harboring this disappointment is not small, we are at a loss to locate the actual pathology.

In the more obscure forms of chronic appendicitis, where other "points" have failed, it has been my good fortune to make an absolute diagnosis through a "point" located in

the first portion (sigmoidal portion) of the rectum. These cases belong to a class whose symptomatology does not invite attention to the appendix region on account of the total absence of focal symptoms. It is a fact that in many of these cases pressure at McBurney's point has not given us the reflex of pain that we expect and usually get in an appendix lesion of this character, while pressure at Morris' point has proved equally as negative. An absence of these reflexes is usually sufficient to dismiss the thought of an existing appendix lesion.

The "point" in the rectum, however, has invariably given a positive reaction in the presence of a chronically diseased appendix. The part of the rectum concerned in this examination is the first portion. It commences at the sacro-iliac synchondrosis, usually the left side, is entirely covered with peritoneum and has a mesorectum which gives that portion of the bowel a certain amount of mobility. This mobility is of some value in the examination. Within the lumen of the bowel, at the junction with the sigmoid, about $3\frac{1}{2}$ or 4 inches above the margin of the anus, there exist aggregations of circular fibers that form a valve.

The valve is constant, is known as the valve of O'Beirne, and varies but little in its distinctive circular characteristics. This valve serves as a landmark and is an important factor in the examination.

In making the examination to reach the "point," the patient is comfortably placed on the examining table upon his back with both legs flexed. The index finger, well lubricated, is introduced into the rectum, and a search made for O'Beirne's valve. This valve is sometimes reached with some difficulty, especially when it is located high, or when the examining finger is rather short. It is absolutely necessary that the valve be located. Its recognition is readily perceived; the sensation imparted being very similar to that which the examining finger experiences when introduced into the os uteri during the first stage of labor. In size

I have found the valve to vary, in some as large as a 10-cent piece, and in others as large as a quarter.

The valve having been located, the finger is hooked into it and gentle traction made upon the structures to test the mobility of that portion of the rectum. The tip of the finger is allowed to rest within the lumen of the valve and the patient asked if he experiences any pain. The answer is usually, no. Should there be any pain, it is generally referred to the sphincter area of the rectum. By allowing the finger to rest for a short time this pain will subside. It is desirable that the patient be entirely free from pain while the examining finger is in this position.

After being assured of the total absence of pain by the patient, the tip of the finger is gently pushed upward toward the right iliac fossa, when in the event of an appendix lesion, the finger will touch a point beyond the valve that will cause the patient great pain. As a control maneuver a similar "point" may be touched by sweeping the examining finger toward the left inginial fossa, usually with negative results.

The accuracy of the diagnostic worth of this point has been verified in some two hundred cases.

The patients comprising this series gave a period of time when their health was not good, ranging from six months to twelve years.

After ablation of the chronically diseased appendix, the patient was fully restored to health in from three months to two years.

INTESTINAL PTOSIS PRODUCING INTESTINAL STASIS FROM THE ORTHOPEDIC VIEWPOINT.

WHEN AND HOW ARE THESE CASES BENEFITED BY NON-OPERATIVE TREATMENT, AND WHEN ARE THEY TO BE OPERATIVE?

By Robert Carothers, M.D.
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A ptosis of the abdominal viscera has existed in some form or other since man walked erect, yet it remained for Glennard, in 1887, to so accurately describe it that the condition now bears his name.

Since then the literature has fairly boiled over with articles on this subject. The internist has contributed much on auto-intoxication, foodstuffs, and drugs. The rest treatment enabled the neurologist to benefit many cases by a change in position of the sagging intestines and thereby allowing them to better empty—and so he wrote on the cure of neurasthenia by rest. The orthopedist after the rest of the neurologist applied bands and braces and was thereby enabled to contribute something. The surgeon opened the abdomen, studied the living pathology and has added, in the sum total of wisdom, by far, the most. The radiologist offered much in the problem of stasis and Metchnikoff in his semi-medico-socialistic books has appealed to the lay mind on this self-same subject.

It might seem, then, that enough had been said, and yet we are not altogether clear in the etiology and what line of

treatment is best instituted when the diagnosis, which is comparatively easy, has been made. The last word has not yet been said.

A very careful study of a typical case of intestinal ptosis causing stasis, will suggest to the mind, that the subject does not belong exclusively to any one line of work and that one of several specialties has a right to speak out in meeting. The object of this paper is to give the Orthopedist's viewpoint on this subject, as I see it, and if possible from my own observations and the deductions therefrom, add something which will benefit a few of these cases.

If one's medical activities bring him in contact with a varied number of bone and joint cases, especially the acquired deformities, he would not observe closely if he did not see that with the changes in the osseous system are changes, also, in the muscular system. If the observation continues, it will be seen that the vascular and nervous system are also undergoing changes and that changes are occurring in all the exterior body accessible to the eye and touch.

Let us draw the picture a little more accurately. We see the child, say the little girl, aged eight years; she is fat and rosy, square-shouldered, straight, has a hollow in the small of the back, round belly, prominent buttocks, straight legs; places her feet true on the ground, the internal border parallel and the big toes pointing toward each other. Head up, she walks erect with a spring to her feet and plenty of knee action. Her circulation is good, even to the tips of her fingers and toes. Secretions and excretions are perfect; she knows not an ache or pain and sleeps after each day of hard play. Her ancestry is good or fair, and her chances in life are equal to her friends under the same conditions.

At sixteen we meet her again. She has high heels on her shoes now, which are also pointed in the toes. This, in itself, tends to turn the toes out, and she is constantly

taught to do so. There is not, now, so much spring to her walk; the knee action is disappearing; and the shoulders are showing the slightest indication to droop. These are the first changes in the osseous system.

She menstruates and at such periods has a pain in her back. Her color and circulation are not yet impaired but her energy is slightly waning and she is taking on a little fat. Of the working classes, she has gone to work in a factory or department store and is on her feet for many long hours. A little tendency to constipation is observed and her intimates have noticed a very slight irritability, at times, of her disposition.

At twenty-four we meet her again. The strain of life, work and worry has told on her these past eight years and she is hardly to be recognized. She is becoming thin, her expression is that of pain; has hollow eyes with dark circles under them. She has a sallow skin, with an acne on the face, chest, and back. The shoulders are very much drooped, the back more or less straight, the buttocks flat, and the pelvis in standing or walking looks not unlike it was pushed ahead of a plumb line of the body, apparently to effect an equilibrium.

The feet are flat and painful with corns and bunions on them. She toes out very much in walking and no longer uses her knee-joints, except for complaints of pain on the inner side where the strain is greatest. With these and a few lesser deformities, the osseous changes become complete. Her joints are all loosened from strain, and she has a weakened, flabby, and poor musculature. Especially is this marked in the abdominal muscles which are extremely weak and permit of a sagging to the bottom much like a half-filled sack.

With these changes there is a marked difference in the vascular system. The pulse is rapid and weak. The hands and feet are cold and clammy, and a varicosity of some veins is to be observed. The menstrual period is now a nightmare

—so distressing and painful has it become. A movement of the bowels does not occur except with the use of cathartics, or when a self-poisoning of the alimentary tract is induced, then a diarrhea for a few days will occur. Constipation becomes obstipation.

It is in the nervous system where the greatest subjective changes are probably to be found. Aches and pains occur all over the body and the headaches complained of are almost maddening. No longer affable, her disposition is one of extreme irritability and at times the outburst of temper are suggestive of a derangement of the mind.

Who is it that has not seen just such, or a similar case? Perhaps not so severe or maybe more so. Usually a woman, but occasionally a man. With such marked changes in the body externally is it not likely that similar deformities will be found inside the body. Let us see.

The right kidney is loose and floating; so, also, the left ovary is prolapsed. The stomach—in fact the entire intestinal tract has dropped low in the abdomen and the *x*-ray examination shows points at which there are obstructive turns, called kinks, in the small bowel. The large bowel will look like it was much folded upon itself in the shadow cast by bismuth paste. This pathology might easily be carried on and the picture be not overdrawn. A vicious circle is established commencing at either locality—the mobile cecum or the flat foot. Whichever at first, it is both in time.

It would seem that the etiology is some congenital physical weakness, which renders the unfortunate individual unable to resist the strain of living, and to fight the economic and social conditions of the present day as he or she finds them. With such a case on our hands what can be the treatment?

In the abstract much can be done and the greatest good will come through prophylaxis. If properly shod and taught how to walk, the child does not have flat feet; and, when the clothing is properly swung from the shoulders,

the round shoulders, are not so likely. If a careful attention is given to the bowels to avoid constipation, the mobile cecum, Jackson membrane, dropped colon and the Lane kinks are not to be found. When the girl, who is absolutely unfit for factory work, is given employment suited to her mental and physical makeup her chances in life will be much greater. If the physical and social conditions of the child and youth can be better arranged, the foundation for the grind is better built, and the wear and tear not so fast and great.

However, these cases of intestinal stasis associated with internal and external deformities will exist and appeal to you for help.

A very large number of the orthopedist's clinentèle come for painful feet. If a careful examination of such a case be made, it is surprising how many will be found to have other physical changes, including an intestinal ptosis and stasis. During one's examination and to make certain investigations, much will be gained by putting such a case to bed for a few days. In the recumbent posture, the physical strains are relieved. With a laxative given for a few days followed by a high enema, then, the enema alone, it is suprising how greatly the patient is improved and how much the stasis is relieved—even in some cases to complete disappearance.

This is a class of cases which belongs to the orthopedist, is non-operative, and with a correction of the bone and joint changes, scientific exercise, massage, and good food, the other changes disappear and the individual is made a practical and useful citizen.

I would beg leave to report, somewhat at length, a case illustrative of this class whose successful result has been followed by many others.

In August, 1906, a married woman, aged thirty years, consulted me for indistinct pains in the legs, back, head, and abdomen. She was thin, anemic, pale, nervous, and tired out. She was of the better working classes and had

commenced to work at the age of sixteen as a house maid. Her previous history and what several photographs taken in childhood would indicate, showed her to be a normal, healthy girl.

From the time she became a wage earner, there was to be noticed a very slow and gradual depression in her physical storehouse. At twenty she married a mechanic and for a time improved. Then she commenced to go down hill, until at the age of thirty, when I saw her first, she had all the physical and mental signs of the typical case of intestinal stasis, previously described, and chief among which was profound constipation, imagination, and damnation. She had been much doctored, curetted and every conceivable opinion and advice had been given. Without sex instinct she was childless; she was helpless and almost hopeless.

Immediately she was put to bed for a period of six weeks, given a capsule of forty drops of castor oil every four hours, and a high enema once in twenty-four hours. This, with massage and good food, caused a rapid and substantial improvement in her condition. It seemed advisable then to do some surgery, resulting in a radical cure of an inguinal hernia, the removal of a large appendix and a prolapsed irritable left ovary. The opened abdomen revealed a floating right kidney and intestinal ptosis. This was before the days of *x*-ray, Lane's kinks, and Jackson's membrane, so I do not know if those were present.

After a surgical convalescence she was put on her feet, in mechanical splints and braces, given exercises for muscle development, a philosophy by which she could live and put to work.

In these past six years she has completely regained her health or made at least a fairly normal woman. She is comfortably fat, happy, and sensible; wears true tread shoes and a very long hip corset as the only reminders of medical advice. With a very gentle laxative her bowels move daily.

She has superintended the building of a new home, buried

her husband, and now makes her living as a book agent and says she does not even get tired.

If a case of intestinal stasis is not improved by rest and palliative treatment in a reasonable length of time, it is presumptive that it will not be helped and is not a non-operative surgery. It is my custom to give these cases a tryout, but when not benefited they are referred to the abdominal surgeon.

There is still a class of cases which are non-operative and if any relief is to be theirs (which is doubtful) it will come through the care and judgment of the orthopedist. Fortunately they are few, the general splanchnoptosis cases, but when seen I have found no good operation and have given some slight relief with braces.

Conclusions. 1. An intestinal ptosis producing stasis is an acquired deformity inside the abdominal cavity associated with other deformities there and also on the outside of the body.

2. That a certain percentage of these cases are benefited by palliative treatment combined with a vigorous correction of the external deformities—sometimes cured.

3. Like the rigid flat-foot, a certain percentage are only to be relieved by operative interferance after palliative measures fail.

ADDITIONAL REMARKS ON PLUGGING WITH SOFT TISSUES TO ARREST HEMORRHAGE FROM BONE

By George Tully Vaughan, M.D.
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This method of arresting hemorrhage was first used by me some ten years ago and I desire again to invite the attention of surgeons to its simplicity and efficiency. I have used it with satisfaction in a great many operations where bleeding from the bone was troublesome, as in fractures of the skull, sections of the skull for any purpose, as for tumor or Gasserian ganglion removal, amputations, resections, bone transplantation, and in osteomyelitis to prepare the cavity for iodoform or bismuth paste.

The method consists in cutting a fragment of soft tissue, muscle or fascia, preferably muscle, from any convenient place in the field of operation and applying the fragment to the bleeding surface or edge of the exposed, broken, or cut bone, by means of the fingers. If the tissue does not adhere at once it should be rubbed into the bleeding area by some suitable instrument, as a knife handle, dissector, or chisel, so that the vascular openings in the bone become plugged with little fragments of soft tissue. The advantages are obvious—the material is always present, it does not require special preparation, it does not act as a foreign body, and according to my experience it is always efficient.

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THE DIAGNOSIS AND TREATMENT OF RENAL AND URETERAL CALCULI

By John B. Deaver, M.D., Sc.D., LL.D.
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There are no pathognomonic signs of renal and ureteral calculi. Instruments of precision may fail to furnish any evidence of the presence of stone; the clinical history is often indefinite; microscopic and chemical examinations of the urine may be made with negative findings, and the physical state of the patient lead to no definite opinion; yet instances are extremely rare when the tout ensemble of evidence gained in the employment of these various measures will not lead to a correct diagnosis. The evidence of the skiagraph, cystoscope, ureteral catheter, and functional kidney tests have taught us to demand not only the absolute pre-operative recognition of the presence of calculi but their position, number, and size, their effect on the functional activity of the affected and the supposedly healthy kidney, and the safest and easiest method of surgical procedure. In a small number of cases these measures may fail us and we find ourselves obliged to come to a conclusion in the absence of that evidence upon which we have come to depend so much. The dilemma is greatest to those who have not worked in that era of renal surgery when the clinical history was the chief factor in the diagnosis of urinary calculi, for that faith borne of experience in the study of the natural history of urinary lithiasis will lead to a correct diagnosis and treatment in the majority of this fortunately small

class of cases, most obscure from the viewpoint of the instrumental diagnostician.

Clinical History. An attack of typhoid fever preceded the onset of symptoms of stone by a number of years in 12 of the 60 cases of renal and ureteral calculi which form the basis of this report. We believe that a catarrhal condition of the pelvic and ureteral mucosa, usually of infectious origin, is the principal predisposing factor in the formation of kidney and ureteral stones.

The initial symptom in the majority of cases is an attack of renal colic of varying degrees of intensity, but usually severe. In 33 of our cases, severe colic ushered in the clinical symptoms, 13 complained of pain other than true colic, 10 renal cases first noticed soreness, dragging-down sensation or aching in the back, 1 first noticed hematuria, 1 frequency and urgency of urination, while in a case of stone impacted in the intramural segment of the ureter, urethral irritation and frequency of urination antedated the onset of renal colic by one year. Trauma in the form of falls, blows, and kicks over the kidney area, heavy lifting and pulling, preceded the onset of symptoms in 7 cases. Of the 45 cases giving a history of one or more attacks of renal colic, the stone was in a renal and ureteral position in equal proportions. Repeated attacks, as Ransohoff has shown, are more frequently due to stones situated in the ureter. In only one instance was the patient entirely free of pain and in this case the diagnosis was doubtful. The passage of blood clots in renal tumor, pus, plugs in tuberculosis, twists of the ureter in movable kidney, the paroxysms of pain in certain types of nephritis, the so-called hematuric nephralgia, the ureteral crises of tabes and various extra-renal conditions, of which gall-stones and appendicitis are the most important, must be differentiated from the colic caused by stone. We will dismiss the subject of differential diagnosis by stating that 6 of our patients had been operated upon for chronic appendicitis, with secondary operations for

adhesions in four instances, 1 for cholecystitis with negative findings, and another had had the stone-bearing kidney suspended. Chronic dyspepsia, a sudden anuria, prolonged hematuria, pyuria, or fever may be the only evidence of urinary lithiasis, but these cases are extremely rare and pain is the predominant symptom. The location, type, frequency of attacks and points of reference of the pain are indicators, in a general way, of the location of the stone. Pain is limited to the affected side, with the exception of those rare cases presenting a renorenal reflex of which this series contained one indefinite example. The constant backache, soreness, and twinges of pain on motion in the kidney region are strongly suggestive of renal stone. In 50 per cent. of our cases there was no reference to the pain in attacks of colic caused by renal stone, while in only 7 per cent. of the ureteral cases was the pain localized. The points of reference are the same with the stone variously situated, but severe pain referred to the under surface of the glans penis is most suggestive, as 8 of our cases demonstrated, of stone impacted in the lower end of the ureter. Pain referred to the testicle and aching of these organs on heavy lifting, etc., is noted in equal proportions in renal and ureteral cases. Nausea and vomiting attend approximately 50 per cent. of attacks of renal colic. Collapse with chills, followed by fever and profuse sweating, are infrequent results of severe pain or of the exacerbation of infection caused by the impaction. The nearer the stone to the lower end of the ureter, the more marked the disturbance of micturition. Urgency of urination with vesical tenesmus and the frequent passage of small quantities of urine, associated with burning pain in the hypogastrium, usually during, but often immediately preceding or following the act, and referred along the urethra, is present in 50 per cent. of cases of stone situated in the lower half of the pelvic portion of the ureter, and in practically every case of stone situated within its intramural segment. These same symptoms are less frequently seen in stones

occupying higher ureteral positions and in approximately 20 per cent. of renal cases, but are markedly less in intensity. Disturbances of the pulse and temperature were due in two instances to a complicating pyonephrosis and in three instances occurred as the result of excessive pain; 9 ureteral and 6 renal cases gave a history of hematuria.

Physical Examination. Physical examination in cases of aseptic and otherwise uncomplicated renal and ureteral calculi gives no assistance in the diagnosis in one-half or more of cases. It is of more assistance in renal than in ureteral cases, because of the presence of a palpable mass in about 25 per cent. of cases of renal calculus. Tenderness and muscular rigidity may be found in various situations in a proportion of both renal and ureteral stone. Renal mass due to hydronephrosis, the result of impacted ureteral stone, or to pyonephrosis in the presence of a complicating infection, are not infrequent. In 8 cases a mass was palpable in the kidney region which proved in four instances to be due to pyonephrosis, and in the others to active congestion of the organ, the result of the irritation of an aseptic stone in the renal pelvis, with slight hydronephrosis in one instance. These masses must be differentiated from tumors of hepatic, splenic, gall-bladder, intestinal and retroperitoneal origin. The diagnosis, usually easy, is much facilitated in the difficult cases by the use of pyelographic methods. Tenderness and muscular rigidity are the most important physical signs and are rarely absent at some point in the line of the kidney or ureter immediately following an attack of renal colic, and are rarely present in the intervals. Tenderness and muscular rigidity were noted in one-third of the cases of this series but in no instance were these symptoms marked. They are due either to calculous irritation of the pelvis of the kidney, a complicating infection, or to these factors combined. The tenderness is found at the costo-vertebral angle, below the costal margin anteriorly, Touneurs' point in the loin and over McBurney's point. In ureteral

stone, the kidney is sensitized in a small number of cases as the result of increased intracapsular tension through back pressure. Tenderness may be elicited in the line of the renal duct, most frequently in stones situated in the pelvic portion of the ureter, at a point one inch below and internal to McBurney's point, or as Morris says, at the junction of the upper and middle third of the line of the iliac artery. Muscular rigidity is less marked than in renal stone, although a decided scoliosis of the lumbar spine attended a stone impacted in the ureter 4 cm. from its vesical end. Guyon's assertion that ureteral tenderness is found per rectum in the presence of stone, even when occupying a high abdominal position, is not confirmed by our observations. We were able to diagnose 1 case of stone impacted in the lower end of the right ureter by rectal palpation. The accessibility of the terminal three inches of the female ureter, as it runs through the base of the round ligament, in close relationship with the anterolateral wall of the vagina, renders stones in this portion easy of palpation.

Routine examination of the blood should be made in this as in all surgical conditions, but rarely does it give information of great practical value. In the differentiation of splenic tumors the result of hemopoietic disease, in estimating the degree of anemia consequent on excessive or prolonged bleeding, which, however, is rarely seen in calculous disease, and in the determination of the degree of toxemia in infectious complications, the blood examination may be of valuable assistance. In one case of this series, a chloroanemia, associated with a moderate leucocytosis in the absence of hematuria or infectious complications, was due to an early malignant change in the pelvic mucosa complicating stone.

Microscopic hematuria immediately following a severe attack of renal or other abdominal colic is most suggestive, but by no means diagnostic of stone. The urine of both the

renal and ureteral cases contained red blood-cells on admission to the hospital in 35 per cent. of cases. Marked pyuria of renal origin, in the absence of tubercle bacilli, is usually due to calculous pyelonephritis. Small numbers of pus cells, epithelial cells, and tube casts and albumin are of frequent occurrence but of no diagnostic significance.

THE *X*-RAY. The skiagraph in the hands of the experienced worker is the most valuable means at our disposal in the diagnosis of urinary calculi. True, there are innumerable sources of error, yet the fact remains that the presence of renal and ureteral stones, their number, relative position and size can be accurately determined by the expert interpretation of a good skiagraphic picture in at least 90 per cent. of cases. In 32 of our cases with a positive *x*-ray report, the correctness of the diagnosis was confirmed at operation in 30 cases. In one of the exceptions the shadow was cast by an exostosis of the twelfth rib and in the second case by a dense peripelvic exudate. No stone was found in 3 of Israel's 245 cases with positive *x*-ray findings. In none of the 13 positive diagnoses of shadow in the ureter would our Röntgenologist give a positive diagnosis of stone, but advised skiagraph in association with the styletted catheter to distinguish from the various extra-renal causes of shadow. In all of these cases the stone was found at operation. The great variability in the topography of the normal ureter, as determined by studies with the shadowgraph catheter, makes the positive diagnosis of stone in the ureter, from a skiagraph shadow alone, impossible. The combined use of the *x*-ray and shadowgraph catheter is the most trustworthy means of diagnosis of ureteral stones, and although not infallible, and at times necessitating stereoscopic methods, instances are rare when the cause of shadow cannot be demonstrated as of intra-ureteral origin by these measures. In 5 of our cases, the *x*-ray failed to find the stone which in three instances was found at operation in the ureter and in two instances was renal

in position. In only one of these cases was the catheter of value and then only in demonstrating the existence of ureteric obstruction. The use of wax-tipped catheters is said to be in these rare cases the court of last appeal in our diagnostic procedure, but we rely entirely on the clinical history. The increased frequency of demonstration of gall-stones in skiagraphic plates, latterly called to our attention by Bevan, creates the necessity of their differentiation from renal stones. This is much simplified with the use of pyelography and stereoscopic skiagraphy. Stones situated in the lower end of the ureter are the most difficult of skiagraphic demonstration, and it is impossible to diagnose their presence, even in the presence of a shadow, or to accurately locate the stone in relation to the bladder wall, on account of the variability in position of the ureter in different degrees of distention of the bladder and the indefinite landmark for orientation. As accurate localization determines the method of operation this is of paramount importance and can only be done by means of the ureter catheter alone or in combination with the *x*-ray.

Cystoscopy. In 2 of our cases with a history of recent colic, the cystoscopic examination showed the presence of small stones in the bladder and the evidence of recent injury to the ureteric meatus. Stones situated in the intramural segment cause edema, swelling, congestion, pouting or relaxation of the meatus, appearances which in the presence of a small mound of mucosa in the line of the ureter, often with the ureteral orifice on its summit, are typical of stone in this position. Distortion, thickening, retraction, ulceration, and displacement of the ureteral orifice with non-functioning or the emission of blood or pus are cystoscopic findings in certain complicated renal cases which aid in localizing the trouble. The bladder mucosa is usually uninvolved in calculous pyelitis and the presence of volumes of pus in a healthy bladder in the absence of tubercle bacilli is almost diagnostic of this condition.

The Ureteral Catheter. The combined use of the *x*-ray and shadowgraph catheter is to be employed in every case suspected of ureteral or renal stone. In 2 cases of ureteral stone both the *x*-ray and ureteral catheter gave negative findings. At operation undertaken from clinical symptoms alone, the stones were located at 4 cm. and 32 cm. respectively, from the bladder. In 12 cases diagnosticated as calculous obstruction the operation proved the stone to have been accurately located, except in 2 cases, in one of which a stone diagnosed 12 cm. from the bladder was found 3 cm. distant; another at 4 cm. was found in the bladder wall. The error in the latter case caused the patient to be subjected to an unnecessary extraperitoneal dissection as the stone had to be removed transvescially. The relaxing influence of the anesthetic may have caused the stone to descend.

The most frequent causes of ureteral obstruction, however, are either physiological or anatomical. Spasm of the ureteric or vesical musculature is seen in 30 per cent. of all cases examined. Its most frequent site is at the ureterovesical junction, but may occur at any point in the ureter, and is often impassable. Cockwitz and Wolfer found mucous membrane valves in 20 per cent. of cadavers of children, most frequently, as in the case with congenital atresia, in the pelvic portion of the ureter. These valves, present in adult life, may obstruct the passage of the catheter in a number of cases. Stone is the most frequent cause of surgical obstruction. Tubercular ureteritis, stricture, the result of congenital atresia or aplasia, cicatricial changes following trauma, operative or accidental, and extra-ureteral pressure, often due to anamalous blood vessels, are additional causes of surgical obstruction of the ureters.

According to Braasch, 75 per cent. of cases of ureteral stone cause obstruction to the passage of the ureteral catheter, in two-thirds of which the obstruction can be passed, and this is immediately followed by an active flow of urine

denoting the presence of hydro-ureter. If the obstruction is at the level of a shadow to be recognized the information is of the greatest value. In only one of our cases could the obstruction be passed and a hydro-ureter demonstrated, although dilatation of the ureter is of frequent occurrence, as operation showed this condition in 50 per cent. of the cases; an obstruction confirmed the report of hydro-ureter in half of the 22 cases of ureteral stone operated on in the Mayo Clinic during the past year. The injection of fluids through the ureteral catheter, injection radiographs, etc., are of limited practical value in the diagnosis of ureteral stone and the demonstration of hydro-ureter in the average case. Braasch claims to be able to detect the uneven surface of ureteral stones with the catheter in 80 per cent. of cases, and that the stone could be palpable in 70 per cent. of 30 cases of renal stones in the pelvic position. Examination of the urine collected by means of the ureteral catheters is important in localizing the disease, but microscopic blood is too often due to trauma to be of much practical value. Cultural examination of the urine is of value in the exceptional case. Before attempting any operation, but especially one to be performed on the urinary tract we must satisfy ourselves not only of the adequate functional activity of the renal tissue, but in the latter type of operation must be assured that the reserve force of the healthy or least diseased kidney is sufficient to sustain the renal function in the event of necessity of nephrectomy, a necessity which cannot be foretold. In cases of aseptic stone, when a normal amount of normal urine is secreted, operation is performed in the absence of evidence of the absolute functional capacity and reserve force of the individual kidneys, as determined by the various functional tests. In all cases in which the sum total of evidence, especially that gained in the study of the amount and composition of the urine, leads to the suspicion of inadequate power of renal secretion, we employ either the indigo-carmine or phenolsulphoneph-

thalein tests for qualitative estimation, or the latter for quantative estimation of the functional activity of the kidneys. By these measures we are enabled to select not only the proper cases, but of far greater importance, the proper time for operation. In cases of uncomplicated renal and ureteral stones the necessity of using these tests is absolute in very few cases.

Operation. *Ureteral Stones.* Stones situated in the intramural segment of the ureter, or, stated in the words of a good working rule, stones situated in the terminal 2.5 cm. of the ureter are to be removed transvesically. In females when the stone protrudes from the ureteral meatus, it may be removed with forceps through an endoscopic tube, or be displaced into the bladder with the finger per urethram. Otherwise after opening the bladder above the pubes, the ureter meatus is dilated or incised and the stone extracted with forceps, or if in a higher position the mucosa overlying the stone is incised in the long axis of the ureter and the stone extracted, which procedure is free of the danger of pelvic cellulitis from extravasation of urine, providing the stone is not embedded above that portion of the ureter surrounded by vesical musculature. No repair of the ureter is necessary and in clean cases the bladder wound is closed and a permanent catheter introduced. In 6 of our cases the stone was removed in this manner. In 3 of these a primary extraperitoneal dissection failed to reach the stone, a mistake in technique, due in one instance, to the ureteral catheter evidence of obstruction 4 cm. from the ureteral meatus. In 1 case the injection of fluid into the ureter caused the expulsion of a small stone, but with the exception of very small stones, in which the diagnosis is problematical, or which, on account of their minuteness, we may reasonably hope will be passed, we operate and do not advise the employment of useless and time-consuming injections of lubricants, anesthetics, etc. With the exceptions above stated all stones should be removed through extraperitoneal in-

cisions. The great danger of peritonitis offsets the value of the transperitoneal method of correcting intra-abdominal conditions, especially in the female, that may stand in etiological relationship with ureteral stone. Necker and Gagstatter estimate the mortality of the extraperitoneal method in stone situated in the lower end of the ureter at 1.35 per cent. We have had no deaths in this series of 11 extraperitoneal ureterolithotomies, 6 suprapubic cysto-ureterolithotomies, and 1 nephro-ureterectomy. All recovered promptly except 1 in which infection necessitated secondary nephrectomy.

Renal Stones. In renal calculus cases the kidney is exposed and if possible delivered through an oblique loin incision. The stone is palpated and an incision made over it on the convex border of the organ in Broedel's avascular zone, the incision enlarged with blunt scissors and the stone removed with forceps. The stone may best be removed in a small number of cases through an incision in the posterior wall of the renal pelvis. In 9 instances palpation failed to demonstrate the presence of stone and in 5 of these it was accurately located with the needle. Incision of the kidney proved the absence of stone in 2 of the cases in which needling had been done without success, in 1 case the stone had slipped into the ureter, while in another the pelvis contained a soft mass of crystalline material. Needling is a practically harmless and valuable procedure in the cases in which palpation fails to reveal the presence of stone. In this series nephrolithotomy was done 22 times, pyelotomy in 1 case and the kidney removed in 5 cases on account of infectious destruction, or destruction as the result of pressure atrophy of the renal parenchyma. In 1 case, in which neither *x*-ray nor cystoscopy had been done on account of the patient's refusal to submit to these measures, and in which it was impossible to locate the source of the pyuria and hematuria, an operation, undertaken solely on the clinical history, revealed an aseptic stone in

the pelvis of the left kidney, but the patient died of right-sided calculous pyelonephritis, a martyr to his desire to be both patient and doctor. One case died of acute suppression of urine, another, after nephrotomy, died with symptoms of acute dilatation of the stomach. Postmortem examination did not show the cause of death in either instance. Rafin calls attention to the frequent occurrence of bilateral lithiasis and reports 287 operated cases of aseptic renal stones from various foreign clinics with 4.5 per cent. mortality, and 158 nephrectomies for septic kidney stones, with 18.4 per cent. mortality. All of our infected cases recovered. The total mortality in the operated cases of this series is 6.5 per cent.

SOLITARY CYSTS OF THE LIVER: REPORT OF A CASE

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Solitary cysts of the liver of non-parasitic origin, as compared with other conditions found in and about that organ, are rare lesions and there are few cases recorded in the literature on this subject which are identical with the case that I am reporting, as some of them have been congenitally dilated gall-bladders or ducts or cystadenomata or true cystic livers. They may be either intra- or extrahepatic in origin and they vary in size from small shot to large cavities containing several litres of fluid. The right lobe of the liver has been the most frequent site of the cysts in the reported cases and usually the under surface. They have been more common in the female sex after middle life.

Much discussion has taken place as to the causation of these cysts, some observers believing that they are due to cystic degeneration of tumors, while others take the view that they are of congenital origin and develop in later life, but I think that the consensus of opinion now is that they are usually due to confluence from cystic degeneration and to occlusion of aberrent bile ducts, and in those cases in which the contents do not contain bile this view is not affected, as it is known that the bile passages themselves do not secrete bile. Small cysts can undoubtedly be caused by degenerative changes in nævi and larger ones have been

caused by cystic change in an adenoma of the bile ducts. In my case infarct suggested itself as a possible cause.

In a monograph published in 1906, Eli Moschcowitz reviews the literature to that date on non-parasitic cysts of the liver and comes to the following conclusions:

1. Non-parasitic cysts of the liver are associated with congenital anomalies in other parts of the body, especially with cysts of the kidney.

2. Such cysts of the liver are always associated with congenital anomalies of the liver consisting in aberrant bile ducts which may be extra- or intrahepatic.

3. These aberrant ducts are embryonal rests, formed in the course of development of the liver and have thus far been found only in cystic liver, or livers associated with cystic kidney.

4. Non-parasitic cysts of the liver have their origin in these aberrant ducts and may assume two forms; one arising from inflammatory hyperplasia of these ducts, the other by retention of fluid in these ducts as the result of congenital obstruction.

5. There is no valid reason for classifying these cysts as tumors.

Such cysts have occurred, however, without other anomalies. Cases of long standing are usually surrounded by a firm fibrous capsule which often contains numerous blood-vessels and sometimes calcareous infiltration. The inner surface is smooth and often ridged and of an opaque white color, except where they are very thin walled. The contents vary, but are usually colorless, though the fluid is sometimes bile tinged or blood stained. Albumin is present and in some cases bile pigment, blood, hematoidin, cholesterin and tyrosin have been found. Microscopically the capsule is composed of laminated fibrous tissue which may contain bile ducts, sometimes dilated. Occasionally blood pigment is found between the bundles of fibrous tissue. The fibrous tissue has been found invading the liver tissue for a short distance

and is lined internally with a layer of epithelial cells which are columnar or polyhedral in the small cysts.

In Bland-Sutton's case, which he says is one of the few cases in which an examination of the cyst wall by a competent pathologist has been made, the wall where it joined the liver showed small loculi invested with epithelium and many biliary ducts lined with cubical cells, the main cyst wall consisting of fibrous tissue and its inner surface presented spaces covered with flattened epithelium.

Cotton and Burgess report a case in a woman, aged sixty years, in which the cyst wall was the size of an egg and was situated in the left lobe of the liver. It did not give rise to any symptoms and they believe that it was caused by congenitally aberrant bile ducts. The cyst was tapped and the woman made a prompt recovery. In this case there was some evidence of biliary cirrhosis.

Sharkey's case was a woman, aged thirty-eight years, who died of a fractured skull. The autopsy showed cystic ovaries and a cyst of the liver to the right of the gall-bladder, the size of an infant's head, and with a thin fibrous wall and clear contents.

McDonnell's case was a man, aged fifty-three years, who died of peritonitis from pyloric ulcer. The cyst was situated on the mid-upper surface of the liver and measured 9.5 cm. in diameter. It was adherent to the diaphragm and inferior vena cava and contained thick mucoid material, apple-green in color. There were no renal cysts.

Corner's case was a woman in late middle life who had had symptoms of gall-bladder disease for fifteeen years and was diagnosed as distended gall-bladder. A cyst four inches in diameter was found and removed intact. It had been inflamed, as shown by the organized lymph on its surface, and the contiguous substance of the liver was partly devascularized, hence there was not much hemorrhage.

Plenk's case was a female, aged forty years, who gave a history of progressive enlargement of the abdomen, pain

in the liver region, radiating to the shoulder blades, with jaundice. Later, abdominal pain and distention and bloody stools. Operation revealed abscess fluid, etc. Autopsy showed that death was caused by a perforated gastric ulcer. A cyst the size of a man's head separated the right lobe from the left, extending up to the diaphragm. Signs of inflammation on the inner surface were probably due to infection from the gastric ulcer by its adhesions. Plenk regarded it as a cyst of the bile ducts.

Aldoas reports a solitary cyst arising at the free border of the liver which contained twelve pints of thin, dark fluid. It was sutured to the parietes and drained.

Reynolds describes a case which he says corresponds exactly to Bland-Sutton's.

Brown's case was found post mortem and occupied the fissure of the suspensory ligament. The swelling was smooth and lobular and adherent to the left and quadrate lobes and to the stomach. The other abdominal organs were healthy. Brown says, "It appears to have originated in the accessory bile ducts that are occasionally found at the left end of the transverse fissure."

Shaw and Elting's case died two hours after the removal of 900 c.c. of clear fluid, probably of shock. The patient was a female child, aged one and one-half years. A partial autopsy showed a thick-walled cyst originating in the central portion of the right lobe wall, 3 to 6 cm. thick, covered in part with liver tissue. The inside is lined with a smooth glistening covering which shows old hemorrhage in places. Kidneys apparently normal.

Müller's case was a cystadenoma of the bile ducts which had existed for ten years and simulated ovarian cyst, as it filled the abdomen and contained six litres of chocolate-colored fluid.

Miller's case was a tremendous dilatation of the gall-bladder and bile ducts beginning at an early period of intra-uterine life. The child was a girl, two and one-half

years old, and the kidneys and other organs were healthy. The cyst was sewed to the abdominal wall and three litres of thin fluid resembling bile escaped. Bile flowed from the drainage tract for two and one-half months.

Doran advances the theory that in his case the injury might have caused the rupture of a duct inside the liver, followed by slow extravasation of bile into the bruised liver substance around it, thus forming a cystic cavity. (Most authors agree that subcapsular rupture of the liver can lead to cyst formation.)

Unless cysts of the liver become of sufficient size to give rise to pressure symptoms they are seldom recognized during life. When solitary they are apt to be diagnosed as echinococcic cysts, distended gall-bladders, gummata, new-growths, cystic kidney, cyst of the ovary, pancreas or mesentery. Multiple cysts are not amenable to surgical treatment, but solitary cysts should be completely removed when it is possible to do so with safety. If it is not considered wise to excise them the next best procedure is to suture the cyst wall to the peritoneum, drain and pack. Simple puncture is not advisable.

J. L., colored, aged fifty-one years, mother of seven children. Health fairly good until about five years ago, when she began to have excessive bleeding from a uterine fibroid. In April, 1906, I did a hysterectomy, removing a fibroid weighing five pounds, together with an ovarian cyst weighing six pounds. During this operation the upper abdomen was inspected and if the cyst of the liver was then present it escaped detection. In June, 1911, the patient came to me complaining of pain in the epigastrium which was always worse when the stomach contained food. Beyond a slight rigidity of the right rectus muscle I could detect nothing abnormal, and, as the colon was loaded with feces, I advised her to take some oil and report back, but she did not return until December, when she was in a very run-down condition, complaining incessantly of epigastric pain and

inability to eat any kind of food. In the mid-line, above the umbilicus, there was plainly visible as well as palpable, a small rounded mass, resistant on pressure and with a distinct transmitted pulsation. Because of the position of the tumor and of the absence of symptoms, which would point to other organs, a tentative diagnosis of tumor of the liver was made and the abdomen was opened by a median incision above the umbilicus, under ether anesthesia. The lower border of the left lobe of the liver presented in the wound showing a firmly encapsulated cyst the size of a small orange. The surrounding liver tissue was of normal texture. The cystic area was darker and enlarged veins showed on the surface. The sharp margin of the liver at this point was obliterated and the mass was spherical in outline. At its upper margin and near the centre of the cyst was a small band, irregular in outline, 2 cm. long by 0.5 cm. in width. Except for this the outer surface was perfectly smooth. On account of the condition of the patient and the extensive attachment of the cyst it was sutured to the abdominal wall and drained after over 200 c.c. of clear fluid had been withdrawn. After the evacuation of its contents there was a cup-like cavity left which felt more resistant than normal liver tissue. The inside of the cyst lining resembled peritoneum, and the fluid removed was slightly cloudy, specific gravity, 1.005; a trace of albumin was present. Microscopically there was nothing but cellular detritus.

Convalescence was uneventful and the drainage tract closed entirely in about four weeks. Seven months later the patient had gained fifteen pounds and was free from any symptoms.

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THE IDENTITY OF CAUSE OF ASEPTIC WOUND FEVER AND POSTOPERATIVE HYPOTHYROIDISM AND THEIR PREVENTION

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The temperature of warm-blooded animals is rigidly maintained within a certain range. The source in the normal state of their body heat is oxidation of chemical compounds.

Physicists tell us that any form of force may be converted into heat, hence one would expect to find among other physical results, production of heat as a result of both motor and emotional acts.

Both motor and emotional acts are produced by adequate stimuli. When an adequate stimulus reaches the brain, whether it be psychic or mechanic, there is a discharge of nervous energy, *i. e.*, there is oxidation. This discharge may be attended by visible action such as voluntary muscular action or invisible muscular and glandular action and brain action. One of the results of this release of force is the production of heat. This heat is clinically indicated by the thermometer. Quite apart from infection or disease, what influences may produce increase in temperature? Anything that will drive the motor mechanism, such as emotional stimulation, physical injury, muscular or mental work, thyroid extract, and iodine. Among examples are anger, play, athletic contests, fear, and

other states of rapid consumption of energy. I have seen the temperature rise 3° in fifteen minutes in a rabbit frightened, and 1° in a child in a tantrum. Routinely one sees some rise in the temperature of a patient on the day of his admission to the hospital, and I have often observed a rise in the pulse and the temperature of anxious relatives, while a visit from an emotional friend to an emotional patient will routinely cause a rise in a patient's temperature. Now what relation has this to aseptic wound fever and to postoperative hyperthyroidism? Since performing operations under the principle and the technique of anoci association, we quite unexpectedly observed a changed postoperative temperature and pulse curve. Analyzing this, we found that the same technique that controlled postoperative hyperthyroidism also controlled aseptic wound fever. Furthermore, if any parts of the anoci technique were omitted, we then observed more postoperative phenomena.

The final convincing proof came when the postoperative wound stimuli were also excluded by blocking the wound with quinine and urea hydrochloride, and we found with the exclusion of the psychic and the traumatic stimuli in both the operative and the postoperative phases, that, barring infection, the postoperative phenomena of temperature and pulse were almost wholly eliminated. The conclusion, then, is that these phenomena are the result of the conversion of energy into heat as a part of the activation of the brain, and hence of all of the body, by the psychic and the traumatic stimuli.

Now these observations suggest that there exists some common principle which underlies postoperative hyperthyroidism and aseptic wound fever, and the fever produced by physical exercise and the primitive emotions, such as fear, anger, and sexual excitation. This general principle is, I believe, a fundamental one, *viz.*, that the entire mechanism of animals is motor, that all the functions are motor,

and that the energy intended to be utilized in a motor act may, in part, be converted into heat. As to Graves' disease, I have heretofore given reasons for regarding this disease as being due to such a disarrangement of the general motor mechanism whereby the threshold (or susceptibility) of the brain to both traumatic and psychic stimuli is lowered to varying degrees. Thus may a given stimulus that would cause no appreciable change in the pulse or temperature of a normal individual, cause, in a case of advanced Graves' disease, with its low threshold, a manifold stimulation—and in consequence the brain and the body of the sensitized Graves' case would be driven as many times as hard, producing a correspondingly greater change in the temperature and in the pulse-rate. This accounts for the influence of morphine on the pulse and temperature, because morphine raises the threshold to stimuli, *i. e.*, it makes it more difficult for a stimulus to reach and act on the brain cells. This hypothesis explains the temperature and pulse changes in the emotional state as well as in simple fractures; and the pulse and temperature changes produced by a stormy visitor as well as by the surgical operation. It also explains the negative side of these phenomena, *viz.*, why a patient well under morphine, or in stupor, from disease, shows no such change; why the aged show so slight and the infant so great a change in pulse and temperature on excitation; why an operation performed under anoci shows no change; it explains why a case of Graves' disease under excitement quite independent of an operation shows precisely the same phenomena as a case of Graves' disease operated without anoci; and finally it explains the absence of these destructive phenomena following operations under anoci. This same principle applies as strongly even after the operation.

If at the time of operation a patient, whether a Graves' case or not, receives so powerful a psychic excitation that in imagery she tends to frequently recall that event, in so doing, each time the original harmful stimulus of the

operation is recalled through associative memory a driving of the motor mechanism is caused. Frequently does the patient recapitulate the anxiety, the suffering, in fact all of the noci associations of the operation, until, at last, the power of recall fades from memory.

Now under anoci the threshold is ever kept high. There is no picture written upon the conscious or subconscious memory, for not even the operation itself has been recorded upon the brain.

Therefore, there can be no destructive recapitulations, there are no *noci associations*, and time is not required to raise the threshold or to dim the memory. Thus is explained the speedier convalescence of the patient without postoperative phenomena under the protection of anoci, and thus we see a general principle underlying both postoperative wound fever and postoperative hyperthyroidism—hyperthyroidism being a pathological, a magnified postoperative wound fever.

DISCUSSION

Dr. W. P. Carr, of Washington, D. C.—This work of Dr. Crile is extremely important and interesting, and the result of it we do not appreciate at first, because it not only tends to the saving of lives and reducing mortality, but it has a humanitarian side that appeals to me. For many years we have disregarded the feelings of patients too much; we have subjected them to tortures we never appreciated, in preparing them for operation, leaving them lying on tables, waiting for the anesthetist to come and put them under ether and failing to allay their fears. I am sure, in the past that this has contributed not only to shock and increased mortality, but has been the cause of an immense amount of mental suffering, and for years I have been trying, in every way I could, to do away with this unnecessary suffering. Dr. Crile has unquestionably showed us a way to do it in a much more complete and effective manner than I thought would be possible. I had experience with a case of exophthalmic goitre just after the meeting of this

Association in Washington last year. A lady, who was one of my best friends, had been having a pulse-rate from 100 to 140 for a year; we did not know for a long time what was the cause of it. Finally she developed a small exophthalmic goitre, well-marked tremor, and decided symptoms of hyperthyroidism. She also had a small fibroid tumor of the uterus, and was operated upon for the fibroid tumor without knowing anything was going to be done for the thyroid. It was an anoci operation as complete as one could be made. The little growth was comparatively insignificant, was removed through the vagina, and she had no fear of this slight operation. I injected the gland with boiling water as suggested by one of our members, while she was under the nitrous oxide anesthesia. She came off the table with a pulse of 80, which had never been under 100 for a year. When she left the operating room her pulse was 80. It never went up any more, and she has been prefectly well ever since.

COMPLETE NON-DESCENT OF THE COLON AND CECUM IN THE ADULT

By W. C. Borden, M.D.
Washington, D. C.

My reasons for presenting this subject to the Society are as follows: (1) The erroneous and indefinite or lack of statement in surgical text-books as to the frequency of non-descent of the colon and cecum in the adult; (2) its comparatively common occurrence in the few series of post-mortem observations carefully made to determine the anatomical disposition of the large intestines; (3) the fact that I have observed this condition but once in my surgical experience and that it appears to have been very infrequently observed by other surgeons seems to indicate that the condition is not as common as would appear from the postmortem observations above referred to; and (4) the fact that the ascending colon may be absent or markedly shortened and that the cecum may occupy the site of the hepatic flexure is to be reckoned with in the differential diagnosis of diseases of the cecum and appendix and in operations directed to these parts of the intestines.

While the colon and cecum are usually normally developed and occupy a relatively constant place within the abdomen, still they are subject to abnormalities, particularly as to position, which are often wide departures from the normal. Of these the most common is a congenital, partial, or complete non-descent of the cecum, with accompanying shortened or absent ascending colon.

The postmortem examinations made by Treves and

Robinson indicate that complete absence of the ascending colon and non-descent of the cecum is more common than is usually supposed, while partial descent of the cecum is comparatively frequent. These observers state that complete non-descent of the cecum with consequent absence of the ascending colon was present in something less than 2 per cent. of their cases. Partial non-descent with an ascending colon under 6 inches in length occurs in approximately 7 per cent. Apparently these abnormalities were about twice as common in men as in women.

Robinson in reporting upon 310 adults, found an abnormally high position of the cecum in 8 per cent. In his statement of 130 cases reported (Mathews, *Med. Quart.*, 1896), he found 2 cases of complete non-descent, in which the cecum lay directly under the liver. Ten other cases showed all degrees of partial descent. He writes, "The partially descended cecum is not uncommon. It occurred in 7 per cent. of 128 cases. Most of these were almost completely descended." In his 130 cases he found the average length of the ascending colon to be 6 inches, the longest was 12 inches and the shortest 3 inches. In this connection it may be stated that Gray's *Anatomy*, eighteenth edition, 1910, page 1298, incorrectly quotes Robinson by stating in a note that Robinson found 8 per cent. of undescended cecum and appendices while Robinson's original article states that he included all cases in which the ascending colon was abnormally short and the descent of the cecum was not absolutely complete.

Treves[1] in his report of 100 cases carefully dissected for abdominal research met with two examples of undescended cecum. Both were males, one aged forty-one years, and the other seventy-four years. In both subjects the cecum was placed at the right side, immediately under the liver and just to the right of the gall-bladder. It was quite

[1] Anatomy of the Intestinal Canal, British Med. Jour., 1885.

horizontal, continued the axis of the transverse colon, and was included between the layers of the transverse mesocolon. The appendix came off from the posterior aspect of the cecum. In both cases the remaining viscera were normal.

Robinson in reporting his cases says that in complete non-descent the ileum is apt to enter the cecum from its underside and slightly toward its posterior surface and the appendix generally lies under the liver just to the right of the gall-bladder.

Fahrenholdt[1] reports that while operating on a cadaver he found the cecum in the right hypochondriac region in close proximity to the gall-bladder. The appendix was normal and pointed downward. Both structures were held in place by the mesentery.

Hartmann[2] exhibited to the Society a specimen from a male, aged fifty years, in which the cecum was situated directly beneath the liver to the right of the gall-bladder. The small intestine was in the right flank in exactly the situation normally occupied by the ascending colon and was attached to the posterior wall by a rather short mesentery. It entered the cecum perpendicularly and at a right angle. The colon ran directly to the left in the usual place.

Debert[3] presented to the Society the abdomen of a cadaver in which the ileum crossed the upper part of the pelvis and with a curve of which the concavity was superior and internal, ascended vertically upward to empty into the posterior part of the cecum. The cecum was quite rudimentary and immediately continuous with the transverse colon without trace of an appendix. In the flank the ileum was in direct apposition with the abdominal walls to which it was affixed by the peritoneum which passed over it without forming a mesentery.

[1] Boston Med. and Surg. Jour., 1894.

[2] Anomalie dans la situati du cecum, Bull. Soc. Anat. de Paris, 1887, lxii.

[3] Ectopia of the Cecum, Bull. Soc. Anat. de Paris, 1897, lxxii, p. 51.

Lockwood[1] reports two postmortem examinations in which the cecum was found in the right hypochondriac region directly under the liver. One of these cases is especially interesting in that death followed intestinal obstruction and an unsuccessful operative attempt at right lumbar colotomy.

Deaver[2] states, "The non-descent of the cecum is not so frequent as is generally supposed." Quain quotes Treves' 2 cases; Cunningham, Morris, Sebotta, Piersol, McClellan, Ersendrath, Leidy, Holde, and Davis make no statements as to the frequency of the non-descent of this part of the intestine.

In spite of the statistics which indicate complete non-descent of the cecum and absence of the ascending colon in upward of 2 per cent. of subjects and the consequent diagnostic and operative difficulties which must often arise in cases having this abnormality, the references above given are all that the writer could find in a rather careful search of the literature in the Library of the Surgeon General of the Army. There are probably other reports which a very careful cross-reference research would develop, but the condition is one which has certainly been little discussed in medical writings. It is for this reason that the following case is reported:

M. H., male, aged twenty-six years. Occupation, butcher. Admitted to the George Washington University Hospital, 3 P.M., December 6, 1911.

Family history, negative.

Previous history, negative, as to abdominal trouble. Always had good appetite, no indigestion. Uses alcohol sparingly, smokes moderately. Usual weight 165 pounds, no loss up to present illness.

[1] Abnormalities of the Cecum Colon with Reference to Development, Edinburgh, 1884.

[2] Surgical Anatomy, vol. iii, p. 171.

Present Illness. On Tuesday, December 5, about 3 P.M., patient was seized with sharp colicky pains in the abdomen. There was some nausea and patient vomited a little. Felt a desire to go to stool and had a large loose movement. There was no chill and patient states that he had no fever. The pain interfered with his rest and, becoming no better a physician was called who pronounced the disease appendicitis and advised operation.

Condition on Admission. Patient well nourished, general appearance excellent, but with a markedly anxious expression of countenance. Temperature 98.6°, pulse 80. Complains of occasional colicky pains in abdomen not localized but diffused and pains radiating into right lumbar region. Palpation shows increased tension on right side. Pressure tenderness not localized but generally diffused on right side from ribs downward, and more marked in right lumbar region. Leukocytosis of 18,000 with 72 per cent. of polymorphonuclears.

Diagnosis. Acute appendicitis; operation advised.

Operation December 7, 1911, 9 A.M. Muscle-splitting incision. On opening peritoneum only small intestines could be found. The incision was enlarged, the ileum located and found to pass with a curve, concavity inward and upward, to the usual site of the ileocecal junction and thence upward in the usual course of the ascending colon. It was quite closely approximated to the posterior abdominal wall by a short and broad mesentery, the peritoneum covering the anterior and lateral sides of the gut. In order to follow the intestine to the colon it was necessary to extend the incision nearly to the lower border of the ribs. The cecum which was very short extended to the right, not downward, and but little beyond the ileocecal junction. There was no ascending colon and the cecum and the transverse colon into which it merged were in direct apposition with the liver. The ileum entered the large intestine at right angles from below and somewhat posteriorly. There was no intraperi-

toneal evidence of the appendix. It was believed to be postperitoneal, the peritoneum was incised, and the short cecum mobilized, when the appendix, 5 inches in length, markedly inflamed and with a gangrenous patch 2 cm. in length at the tip, but not ruptured, was found coiled up behind the cecum in the fossa to the right of the duodenum and over the kidney.

It was liberated and removed. With some difficulty a purse-string closure was made. No drainage was used. The patient made a stormy convalescence, largely due to a severe, acute dilatation of the stomach which developed soon after the operation, but which yielded to repeated stomach washings and position treatment. He was discharged January 14, 1912, and has been in excellent health since.

This case presents the following interesting diagnostic, anatomical, and surgical features:

The diagnostic signs were not marked. The tenderness was greatest at the back just below the ribs. Kidney or ureteral trouble was considered but was negatived by the normal urine; the abdominal tension; the character of the onset with nausea and vomiting; and the leukocytosis which combined with the general symptoms, indicated an appendiceal lesion. On account of the location of the pain it was thought probable that the appendix was extraperitoneal and behind the cecum and colon; possibly with the tip as high up as the lower border of the liver, a condition present in four of the writer's cases. As a matter of fact it was posterior to the cecum and just below the liver.

The anatomical condition was especially interesting. In this case, as in the cases reported by Robinson, Treves, and others, there was no ascending colon. The cecum was quite horizontal, continued the long axis of the colon, and the ileum entered the large intestine from its under and slightly toward its posterior surface. As in the postmortem specimens reported by Hartmann and Debert the small intestine occupied the position usually occupied by the ascending colon.

In Hartmann's specimen there was a short mesentery and in Debert's the intestine was in direct apposition with the abdominal wall without a mesentery. The case reported herein appears to be about midway of the two, for while the gut was not in direct apposition with the abdominal wall it had a very short, broad attachment not corresponding to the usual mesentery.

The cause of congenital absence of the ascending colon is, manifestly, a persisting embryonic condition similar to that which normally exists at about the end of the sixth week of intra-uterine life. As the intestinal canal grows much more rapidly than does the embryonic body, the disproportionate growth causes the gut to first bend and then to be thrown into loops and convolutions.

The first most conspicuous loop appears at some distance below the stomach. Here the bowel assumes a U shape with the closed end of the U projected toward the ventral abdominal wall. Between the limbs of the U runs the primitive superior mesenteric artery, and the vitelline duct is attached to the base of the U nearest the ventral wall. At a point on the lower limb of the U the bowel abruptly acquires increased caliber. This dilatation is the primitive cecum and marks the division between the large and small intestine.

The intestine next proceeds to become twisted upon itself in a definite manner. This twist occurs about the superior mesenteric artery as an axis and is due apparently to inequality of growth in the parts of the U-shaped loop above and below the cecal enlargement. Above this enlargement the bowel grows rapidly to become the long and convoluted small intestine; below the growth the shorter large intestine is produced. Before this disproportionate growth occurs or the twist takes place, the cecum lies near the umbilicus and with the rest of the large intestine is entirely to the left of the median line. With the occurrence of the twist the intestines rotate about the superior mesenteric artery, the cecum mounts upward and over the small intestine, passes

in front of the loop of the duodenum and assumes a position in the right hypochondriac region, the colon passing thence transversely across the abdomen ventral to the duodenum.

This stage of development exhibits the embryonic condition identical with that presented in the adult where the intestinal abnormality consists in absence of the ascending colon as in the case reported in this paper.

In the ordinary adult condition the colon grows larger and the cecum descends to occupy its usual place in the right iliac fossa.

The point of surgical interest in cases of absence of the ascending colon are evident.

In appendiceal disease diagnosis may be more difficult, and differentiation from disease of the gall-bladder, the duodenum, the kidney, and other adjacent structures more uncertain than is usual. In operation for appendicitis there may be difficulty at first in locating the cecum and appendix and, naturally, with this abnormality, as in the case reported by Lockwood, right colotomy or colostomy will be impossible.

EXPERIMENTAL, ANATOMICAL, PHYSIOLOGICAL OBSERVATIONS BEARING UPON THE TOTAL EXTIRPATION OF THE COLON

By August Schachner, M.D.
Louisville, Kentucky

When we consider the arrangement by which 20 or more feet of small intestines are being supported through a peritoneal attachment measuring 5 inches (vertebral border of mesentery); when we think of the inguinal region as the lowest and weakest part of the abdominal wall, and the frequency through which hernias result from the gravitation of abdominal contents against this lowest and weakest point; when we examine the costal arrangement by which it becomes necessary in respiration to raise the costal cage against gravity; when we compare the darkened lungs of the human subject with the clean pink lungs of the quadruped living under the same conditions as a proof of how unequal the cilias are in their efforts to lift the dirt and bacteria-laden mucus against gravity; and, when we watch the pathetic efforts of the tubercular subject to raise against gravity, his expectoration, we get the full swing of the disadvantages of the upright position.

These are but a few of the disadvantages as pointed out by Pohlman, and more fully set forth by Wiedersheim, in his excellent work Der Bau des Menchen.

That man advanced in the evolution we freely concede, but we must not be unmindful of the price that was paid for the advancement, and that will continue to be paid until,

through the natural process of evolution or some artificial means, a better adaptation to the condition can be arranged. The work of Mr. William Arbuthnot Lane, which has extended over a period of more than ten years, and his writings of the last few years, have done more to arouse an interest in this subject than anything else, excepting the work of Elias Metchnikoff, who through his investigations upon the bacterial flora of the intestine, has aided independently and deserves to share with Mr. Lane, the credit of this awakened interest. Mr. Lane's proposal and the procedure, which he for ten years has followed, namely, the removal of the entire colon in properly selected cases, where the sewerage functions of the large intestines are inadequate and unsatisfactory, has in a measure staggered the medical world through its seemingly heroic nature. We are inclined to suspect that in many instances the consideration of the subject ended with this initial surprise and a prompt condemnation of the proposal. The question hinges upon the correctness of the premises and not upon our impression as to whether or not we believe the procedure to be heroic.

Just about one hundred years ago the medical world ridiculed and doubted the performance of McDowell in the removal of an ovarian tumor. An operation considered in the light of that period was far more heroic than the removal of the colon considered in the light of the present developed state of intestinal surgery.

Direct observations of Mr. Lane's work at Guy's Hospital, almost two years ago, gave me the impression, which in time grew to a conviction, that Lane's procedure was here to be reckoned with, and it only remained for time and experience to define its limits and perfect its details.

Its reception will doubtless be a stormy one. It will always remain an operation that deserves to be carefully considered and painstakingly performed.

Mr. Lane has been accused of being too radical. This is not at all unreasonable. The natural place of a leader is

in advance of his followers and in this movement Mr. Lane undoubtedly occupies the position of leader.

The technical difficulties that attend the operation are several.

Shall the ileum be connected with or without the additional step of colectomy? Shall the attachment be made end to end, side to side, or end to side? To these belong the difficulties of properly selecting the cases suitable for the procedure and the operative details common to every intra-abdominal operation as minimizing adhesions, avoidance of shock, and lastly, infection directly or indirectly through imperfect suturing.

A series of experiments upon dogs were conducted by the writer with the hope of possibly shedding a little light upon the debatable operative side of the question.

To avoid too much encroachment upon time and space, we omit details of each experiment.

Only those methods were tried that seemed desirable, namely, side to side, end to end, and end to side. The invagination was tried in the end to end because it seemed suitable in view of the smaller circumference of the small intestine as compared with the receiving lumen of the large intestine.

The end of the small intestine was placed parallel with the end of the large intestine and one-half of the circumference united by means of a through-and-through stitch with the corresponding half of the large bowel.

Two traction sutures, the one at the mesenteric attachment and the other at the opposite point, were introduced from within securing a good, strong purchase at these points and leaving the one end of each suture long and armed with a milliner's needle. The needles were pushed through the wall of the large intestine at a point about 2 inches beyond the line of suture, and used to aid in effecting the invagination. Following this the remaining half was closed by means of a Connell stitch. By pushing upon the

Fig. 1 Fig. 2

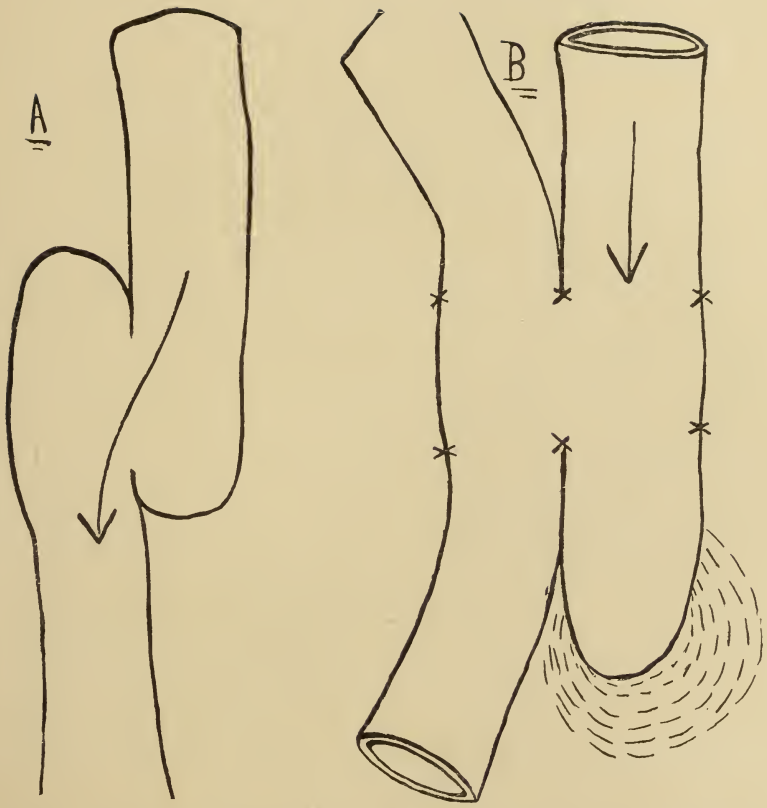

Fig. 1.—Showing tendency for the two sections to pull into a straight line in a lateral anastomosis when there is no excessive overlapping.

Fig. 2.—Showing tendency of the blind end of the proximal limb to become distended beyond the opening where an excess of overlapping exists.

Note. X, X, X, X, the dead areas of the intestine due to the division of the circular fibers.

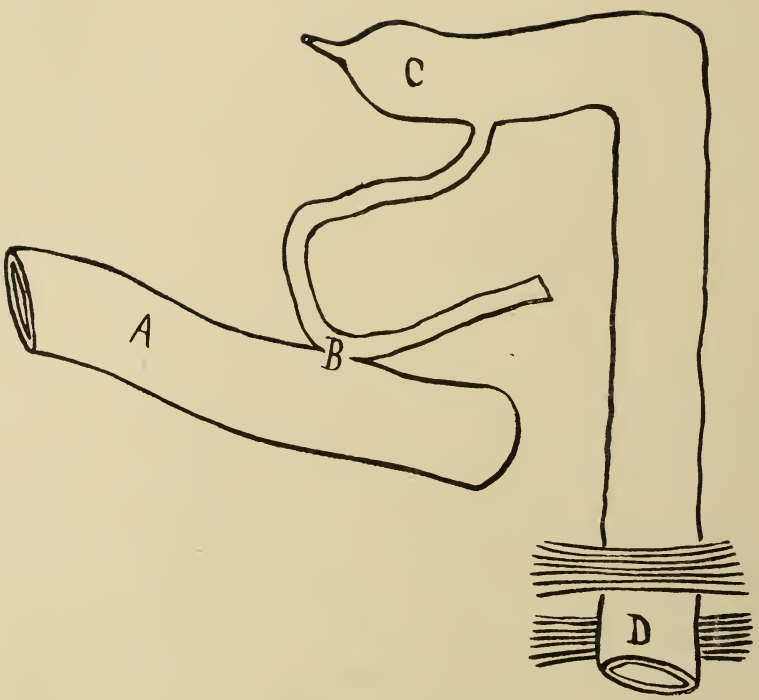

Fig. 3.—Ileorectostomy with artificial anus. *A*, rectum; *B*, ileorectostomy; *C*, cecum; *D*, artificial anus just beyond the separated fibers of the rectus muscle.

small intestine from above, and pulling from below by means of the traction sutures, an invagination was effected bringing broad peritoneal surfaces together.

The invagination was made permanent by the application of two continuous seromuscular sutures, one for each half of the intestinal circumference. The traction sutures were severed close to the intestinal wall, while traction was being made which resulted in the disappearance of the end within the lumen of the intestine. The minute punctures were touched with 95 per cent. carbolic acid, followed by alcohol, and buried by one or two Lembert sutures.

Lateral anastamosis was made in two ways. In the one the blind end was left needlessly long beyond the opening in the proximal limb; and in the other this was reversed, *i. e.*, made as short or without any blind end projecting beyond the anastomotic opening in the proximal limb.

Otherwise the lateral anastomosis was made in the usual way.

In the end to side two methods were tried. In the one, the proximal end was invaginated into the side of the distal limb through two mattress sutures after the method of Jessett, and the invagination made permanent and secure through a continuous Lembert suture applied separately to each half of the circumference of the invagination.

The other end-to-side connection was performed according to the usual method of connecting the duodenum to the stomach or a lateral anastomosis, namely, an outside row of seromuscular sutures and an inside row of through-and-through sutures.

The experiment to which I wish to direct special attention is the following. In a moderate-sized bull dog the midpoint of the descending colon was divided. Its distal end was closed by invagination, and its proximal end brought through and sutured to the peritoneum in the midline. The end beyond this peritoneal line of suture was passed between the separated fibers of the left rectus in its middle

and made to emerge on the surface at a point about one inch external to the outer border of the rectus. An ileorectostomy was made between the ileum, four inches beyond the valve and the large bowels, as near the anus as conditions would permit. The ileorectostomy opening was about two inches, which for the size of the animal was unusual.

It will be seen that an effort was made to favor the passage of the intestinal contents through the anastomosis and in the natural way through the short rectum by making the opening large and the distance between the anastomosis and the anus short—the line of least resistance.

On the other hand, an effort to retard the passage through the other course by compelling it to pass the ileocecal valve, traverse the greater distance and overcome such resistance as the above-described arrangement as the artificial anus would offer. The result was that practically all the movements passed through the ileocecal valve, traversing the longer distance, overcoming the obstacles in the abdominal wall and were discharged through the artificial anus instead of the natural one; the gastro-enterostomy story over again.

The few movements that passed the natural anus were fluid or semifluid with minute evidences of blood for at least eleven weeks after the operation.

Those that passed the artificial anus were formed and had the appearance and consistency common to the normal movement of a dog. The nutrition of the dog for six weeks was impaired. This was attributed partly to the habits of the dog to lick his wounds. We were not entirely successful in preventing this.

The local disturbance and impaired function at the site of the anastomosis played the principal part in the interference with this nutrition. His nutrition finally returned to normal.

Such movements, few in number, and at times only, that passed by the natural anus, were indicative of a proctitis at least up to eleven weeks following the procedure. The

other dogs did not show any indication of an interference with the nutrition. If there was any undue thirst, we failed to observe it. The movements were all semisolid at the beginning, but without any indication of proctitis or other inflammatory disturbance such as occurred in the dog with the artificial anus. In the course of about two weeks, the movements became formed. Up to three months after the anstomosis they remained formed, but were never in that dissected state common to the movements of this animal.

The end-to-end union gives, especially in small intestines, the most perfect functional results. (Cannon and others.)

The chances of infection, when carried out by any of the end-to-end methods are, where large and small intestines are concerned, considered greater than those that attend the lateral anastomosis or an end to side as usually performed.

The end to end may in time be perfected that its risks from infection will be no greater than those that attend the lateral effort. In the Transactions of the 37th German Surgical Congress, Moszckowicz describes a set of instruments for controlling or at least minimizing the risks of infection from the intestinal contents.

While the simple needle and thread should do the work, further improvements in the prevention of the escape of intestinal contents or the exposure of the intestinal mucosa are desirable.

With a given number of operators of varying experience the immediate results of a lateral anastomosis would likely be in favor of the lateral method.

The particular advantage ascribed is that it is easier to secure the approximation of serous surfaces in this than in the end to end.

Furthermore, the difference in the sizes of the joining limbs present no obstacle. The chief disadvantage of the lateral method seems, first, that it is practically a triple operation.

The secure invagination of the ends where two ends are to be dealt with, is not always quite so simple nor as rapid as we sometimes would like.

If the opening is a large one, we have a large dead area as the result of dividing a corresponding section of circular fibers, and if the opening is a small one, the danger of the opening becoming in time insufficient, is not altogether imaginary. The liquid character of the contents of the ileum, reduces this danger to a minimum. The blind end beyond the anastomosis, if it exists, will in time undergo dilatation and may become a source of disturbance. If the anastomosis is made snug, *i. e.*, without any projecting blind ends, a favorable change occurs in the ever-increasing tendency of the two limbs pulling themselves in a straight line, which results in a condition not unlike the end-to-end anastomosis.

The end-to-side union, performed in the usual manner, has practically all the advantages of both without the disadvantages of either.

The symptoms and signs of intestinal stasis as well as the pathological anatomy, have been presented by several writers in the recent current literature.

We forego repeating what is clearly set forth by Mr. Lane upon the pathology and the complete clinical report by Mr. Chapple of the end results of 50 cases. These two papers can especially be commended as they represent the views as expressed by Mr. Lane and his associate. (*British Med. Jour.*, April 12, 1911.)

According to Gerster and others, the bands and membranes are due to a colitis and pericolitis, the result, as Pilcher expresses it, of a long-continued, or oft-repeated mild infection of the peritoneal covering. It is, we believe, beginning to be realized that while the bands do support, they also more or less interfere. It seems fair to assume that the arrest, for an undue time, of the bacterial-laden contents of the large bowel, especially where there is an abun-

dance of moisture organisms and lymphatics as in the cecal region, that the continuance of such a condition for a long period will result in permanent changes.

The work of Metchnikoff plainly suggests the chemical side of the question, *i. e.*, the chemistry of the large intestine, when its functions are for any length of time interfered with. Efforts are being made to solve the ill effects of the prolonged retention along these lines.

Systems of gymnastics are being worked out with the view of favorably influencing this condition, supplemented with bandages which add to the comfort and aid in maintaining a support of the blood pressure. The influence of an abnormally movable kidney, as a factor in the development of splanchnoptosis, has not received the attention it deserves. Few of us, perhaps, realize that the retroperitoneal position of the kidney, when making excursions, enables it to dissect loose, through attrition, the peritoneal attachment that served to anchor the viscera to the vertical column.

Gerster, whose opinions are deservedly worthy of careful consideration, expresses himself as follows:

"Prevention has a wide field of usefulness, especially here in America, where chronic colitis is almost endemic. A reasonable restriction of animal food will control putrifactive processes; a generous and daily use of fresh vegetable matter in the shape of well-cooked and attractively seasoned dishes, will supply bulk and friction needed to induce normal and adequate peristalsis. The practice of what may be called 'physiological intestinal discipline' should be inculcated from infancy and should become as much a part of personal hygiene as are ablutions and baths."

In closing, I wish to emphasize that the problem is comprehensive enough to accept all the assistance it can through gymnastics, bandages, regulation of diet and habits and still furnish an abundant percentage of human wreckage, as Mr. Lane expresses it, for the surgeon to attempt to reclaim.

I wish to convey my thanks to Dr. Benjamin J. Lammers and Mr. Morris Flexner for valuable assistance rendered me in this work.

NOTE.—Since the meeting of the Southern Surgical and Gynecological Association, held December, 1912, I have received a communication from Mr. Lane defining his position upon the question of intestinal stasis and cholectomy. In view of the growing interest in this question, I deem it fair and proper to append, with his permission, his views as follows:

"I do not think my treatment has changed. I believe that if the patient is at all wasted, and the colon is distinctly static, it is far better to remove the large bowel. In other words, when the removal of the large bowel exposes the patient to but little added risk, I prefer to remove it. The result of removal is far better than that of short-circuiting. At the same time, I do a great number of operations of short-circuiting, namely, putting the ileum into the pelvic colon immediately below the last kink for tubercular rheumatoid arthritis, Still's disease, neuralgia, changes in the thyroid associated with stasis, as exophthalmic goitre, diverticulitis, etc., for which cholectomy is not called for. If in these cases I get trouble subsequently in the cecum, which is rare, I remove the large bowel. I do a large number of short-circuitings as the conditions benefited by it in an extraordinary manner are *very numerous*. Those calling for removal of the large bowel are comparatively rare. I have not lost a patient in my female ward at Guy's Hospital from short-circuiting or from removal of the large bowel, for I think, three years. Men are more difficult and perhaps more dangerous."

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THE VALUE OF COMPLETE PHYSIOLOGICAL REST OF THE LARGE BOWEL IN THE TREATMENT OF CERTAIN ULCERATIVE AND OBSTRUCTIVE LESIONS OF THIS ORGAN, WITH DESCRIPTION OF OPERATIVE TECHNIQUE AND REPORT OF CASES

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The value of rest in the treatment of inflamed and infected abdominal viscera has long been recognized. The opium treatment of peritonitis as advocated by Alonzo Clark, which has long since been abandoned, and the more recent so-called starvation treatment of Oschner, have for their purpose the arrest of intestinal peristalsis, thereby bringing about bowel tranquilization. Complete physiological rest of certain portions of the large bowel, usually rectum and lower sigmoid, as accomplished by means of left side colostomy, is of well-known worth, both as a life saving procedure in acute and late obstructions, and as a protective measure in cases where subsequent radical work is contemplated.

The various short-circuiting and exclusion operations upon the gastro-intestinal tract are of undoubted value in selected cases. It is the purpose of the writer to point out in this paper, the advantages of complete physiological rest of the entire large bowel in the treatment of certain diseases of this organ which have heretofore been treated by some of the surgical methods above mentioned and to describe a technique by which this rest can be accomplished and when

its purpose has been fulfilled, the bowel can be put back into commission in a manner both safe and satisfactory.

One of the principles on which modern intestinal surgery is based and which has been responsible for its wonderful progress and marvelous accomplishments, is the principle of rest. Take, for instance, some cases of stricture of the esophagus. Who has not seen some of these relax following the rest afforded by a gastrostomy? In gastric and duodenal ulcer, an abundant clinical evidence has demonstrated the value of the partial rest given to the pylorus and duodenum by gastro-enterostomy. The type of cases in which we have found this surgical rest treatment of value, may be enumerated as follows: (1) Mucous colitis associated with obstructive lesions; (2) ulcerative colitis (amebic, bacilliary, tuberculous, etc.); and (3) obstructions to the colon, both acute and chronic, due to neoplasms.

MUCOUS COLITIS

It has been our experience that in a majority of the cases of mucous colitis, both the symptoms and *x*-ray findings, show marked evidence of interference with the normal fecal flow with the accompanying toxemia invariably associated with chronic intestinal stasis. At operation, the cecum is generally found in the pelvis, dilated, and surrounded by well-defined membrane. Angulations are found at the hepatic and splenic flexures, with the transverse colon sagging almost to the pelvic brim, even with the patient in the Trendelenburg posture. Many of these cases receive marked temporary benefit from the Weir-Mitchell and other medical treatments, associated with posture and properly adjusted orthopedic appliances. It is in this type of case that Mr. Lane has advocated the removal of the entire large bowel down to the sigmoid. Finding this operation too radical, he later has practised the short-circuiting exclusion operation.

Dr. Coffey, a fellow of this Association, has recently published an able and beautifully illustrated paper in which he described an elaborate fixation and hammock-swinging procedure for the correction of the deformities of these unfortunates. While the writer has obtained some brilliant results from the operation of Lane, he has had, however, a number of cases in which most distressing postoperative symptoms have developed for the relief of which secondary operations became necessary. The suspension operation of Coffey, the writer has never undertaken, as our experience with similar fixation operations in the past has been far from satisfactory.

The technique which I will shortly describe, seems from our comparatively limited experience, to better meet indications in the cases under discussion than any of the methods above mentioned. By it, all pericolic bands and adhesions can be severed, the cecum elevated from the pelvis, and the intestinal stasis immediately relieved. The entire colon can be put at rest and during this process of complete physiological rest, the patient can be given the benefits which follow dietetic, hygienic, and orthopedic treatment, thus giving the bowel a chance to regain its normal tone.

ULCERATIVE COLITIS

(Amebic, bacilliary, tuberculous, etc.)

While many of the ulcerative types of colitis respond to medical treatment and colonic lavage, the severer types are now recognized as surgical. In the operative treatment of such cases, three procedures have been resorted to: (1) Appendicostomy; (2) cecostomy; and (3) ileosigmoidostomy. All of these operations are objectionable. The first two simply permit of colonic irrigation and medication. As fast as the colon is flushed with solutions, it refills with

the fecal contents from the small bowel; thus the area under treatment is constantly contaminated. A very serious objection to the short-circuiting operation is that the lower pelvic colon is almost invariably involved in the colitis and it is impossible in the majority of cases to bring a loop of ileum to a part of the sigmoid, distal to the disease so that some degree of the symptoms, namely, that due to the sigmoid below anastomosis, will persist.

OBSTRUCTIONS TO THE COLON (BOTH ACUTE AND CHRONIC) DUE TO NEOPLASMS

The advantage of the operation suggested by the writer will readily be seen when it is applied to the treatment of acute and chronic obstructions of the sigmoid and rectum. It possesses all of the advantages of the left side procedure, with none of the disadvantages. It permits a drainage of the distended small intestine, as well as rest and irrigation of the large intestine. In those cases of low bowel obstruction in which the diagnosis is in doubt, it should be the operation of choice. A left side artificial anus is easily made, but we all appreciate the difficulty of closing it. If the obstruction is due to an inoperable malignancy, the left side anus possesses no advantages over the right side method. If the diagnosis is wrong and the growth is a benign one, it will readily be seen that the left side operation should not be undertaken for the reason that its closure is both difficult and dangerous and will greatly interfere with the subsequent surgical treatment; namely, the closure of the artificial anus. Another advantage of the right side anus is the relief afforded the patient from constantly inhaling the horrible stench that is the invariable accompaniment of the left side operation. The contents of the small bowel possesses only a slight odor, and contrary to former teachings, there is no irritation of the skin from this discharge.

On the contrary, when the operation is done on the left side, the stagnating and filthy fecal flow from the colon brings about a condition almost unbearable.

OPERATIVE TECHNIQUE

Through a right rectus incision, sufficiently long for general exploratory purposes, the abdomen is opened. The cecum is at once sought and the large bowel is carefully examined from cecum to sigmoid. All pericolic adhesions are then severed, the appendix removed, and the stump buried. The ileum is next severed between two clamps, close to the ileocecal valve. The distal ileum is tied off and buried as was the appendix. At a suitable part of the cecum a purse-string suture of linen is placed and the cecum is next incised.

Through this incision a large rubber catheter is inserted after which the purse string is tightly tied. A second purse string of No. 1 chromic catgut is next placed. Under the loops of this purse string three long catgut fixation sutures are placed (Fig. 1). A stab-wound is next made at McBurney's point through which a forcep is inserted. The catheter and fixation sutures are grasped in the bite of this forceps and pulled through the stab-wound. The peritoneal surfaces of the cecum surrounding the catheter are next scarified and the catheter is pulled through the stab-wound, carrying with it the three fixation sutures. The catheter is now slipped through the button and the fixation sutures are threaded through the eyes in the button and tightly tied, thus closely approximating the serous surfaces of the cecum to the parietal peritoneum (Fig. 2). A stiff rubber drainage-tube is next inserted into the proximal ileum and fixed with a double purse-string suture. The ileum is now brought out of the lower angle of the rectus incision. The parietal peritoneum is made to hug it snugly by a few catgut sutures and the abdominal wound is closed in the usual way (Fig. 3). Indications for restoring the continuity of

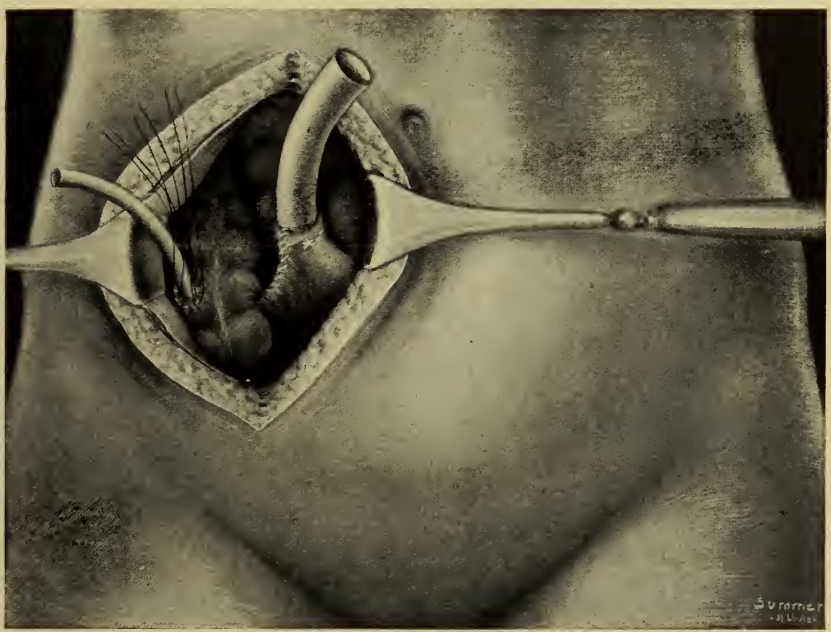

Fig. 1.—Showing tube and purse-string in proximal portion of ileum. Stump where appendix was removed and stump of inverted distal ileum. Also catheter and purse-string in sigmoid, showing fixation sutures.

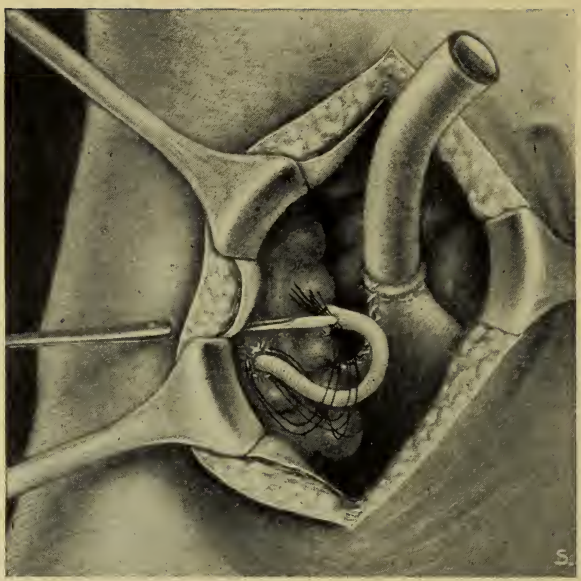

FIG. 2.—Method of making stab wound. The forceps is shown grasping the catheter and fixation sutures.

FIG. 3.—Showing catheter and button in place with fixation sutures tied. Artificial anus with tube in proximal portion of ileum. Wound closed.

the large bowel are, improvement of the patient's general condition and the return to normal of the discharge from the excluded large bowel, as shown after repeated chemical, microscopic, or culture-growth examinations of irrigation fluids passed through it. This restoration should not be made too early, particularly in the ulcerative lesions of the colon. When the surgeon deems that the large bowel has sufficiently healed and desires to put this organ back into commission, this restoration is readily done by simply cutting out the anus at the lower angle of the rectus incision, closing its end with a purse-string suture, making a lateral anastomosis of ileum to the ascending colon, or by switching the ileum into the sigmoid. We have never found any difficulty in restoring intestinal continuity; on the contrary, the operation is simple and easy.

REPORT OF CASES

This paper is based upon the experience we have gained from ten cases so operated. Two were cases of chronic intestinal stasis, with obstructions due to pericolic bands and flexures Both have greatly improved and are now comparatively well. Three operations were done for the relief of amebic dysentery. All were cured. One ulcerative colitis with extensive involvement of sigmoid and rectum. Patient is now in good health. One case of extensive obstructive tubercular colitis. This patient received great relief from the operation and lived in comfort for two months. Three were for late and inoperable malignancies of the rectum. One lived six months, one five months, and the third case is still living, nine months after operation, is comfortable and in reasonably good health; so it will be seen that there was no mortality in the series.

PSEUDOPERITONEAL CAULS OF THE COLON

By John Wesley Long, M.D.
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What is a "caul?" Like most words it has more than one definition. In the ordinary acceptation caul means that portion of the amnion which occasionally persists, unruptured, over the child's head as it is being born. David Copperfield, you will remember, was born with a caul over his face. Such circumstance was believed by the superstitious of olden times to be lucky. The caul itself was supposed to confer privileges upon the possessor and was often dried and kept and sometimes sold for a fabulous price or bequeathed. Dunglison's Dictionary says: "Twenty guineas was asked for one in England in 1779; twelve pounds in 1813; and six guineas in 1848. One seaman carried a caul for thirty years." Hood wrote in the *Sea Spell,*

> "But still that jolly mariner, took in no reef at all,
> For in his pouch, confidingly, he wore a baby's caul."

But the broader definition of the word is that of "any thin, serous membrane," and is especially applied by lexicographers (Standard Dictionary) to the folds of peritoneum forming the great omentum. Therefore, it seems quite proper to designate the thin, adventitious, veil-like membranes which form about the colon and are evidently of peritoneal origin as a "caul." The term at least indicates the character of the membrane, since as stated, "caul" means a thin serous membrane.

Furthermore, the fact that colonic membranes are new formations, abnormal and not normal, false and not true, suggests that the prefix pseudo may very appropriately be appended; hence, *pseudoperitoneal cauls of the colon.*

In this connection it must be admitted, what is a well-known fact, that naming the baby is often a difficult matter, calling forth much discussion, and sometimes family jars. Particularly is this true in matters surgical, when we undertake to define a condition whose "etiology and pathology," to quote Grant of Denver (personal communication) "are both as yet undetermined." Writers have been altogether too busy discussing the condition found, its probable etiology, symptom-complex, pathology and treatment, to concern themselves with the proper title for this new surgical baby. But there is something in a name, and the discussion on Dr. Morris' paper, read at this meeting shows that even this dignified body may balk at so small a thing as a name, though it be as attenuated as a "cobweb."

This reminds me that Morris, a year ago (TRANS. SOUTH. SURG. AND GYN. ASSOC., xxiv, 81), in discussing certain new formations, found in the upper portion of the abdomen, called them: "Cobwebs in the attic of the abdomen," which to my mind is strikingly descriptive. However, this term is hardly so applicable, nor did Morris so intend it, to the well-organized vascularized veils or membranes seen surrounding the colon, as it is to the delicate, reticulated tissues that occur in the region of the pylorus and gall-bladder. It is probably true that they are of the same nature in both instances, differing in structural formation, largely because of the anatomical and physiological dissimilarity of the viscera about which they develop.

The pseudomembranes seen about the colon are often spoken of as "adhesions." Binnie in *Month. Cyclop. Pract. Med.*, June, 1905, vol. viii, p. 341, describes the condition as a "delicate curtain or web of adhesions covering the cecum." Hofmeister in *Prog. Med.*, June, 1911, p. 123, speaks

of them as "veil-like adhesions." Connell in *Surg., Gyn., and Obst.*, November, 1911, vol. xiii, p. 485, treats of this and kindred ailments under the title of "Ileocecal Adhesions."

It would appear that the writers just quoted and indeed many others, regard the formations in question as "adhesions" and so designate them. However, there is sufficient difference of opinion, as will appear further on, to raise the question: "Are they adhesions?"

In a qualified sense, it may confidently be asserted that they are, but there is abundant testimony tending to show that if adhesions at all, they belong to a class by themselves. The word "adhesion" scarcely conveys the correct meaning and should be reserved to indicate that dense union of viscera, or viscus and parietes, characterized by destruction of the superficial layers and infiltration of the deeper coats of the viscera, oftentimes with organic union. For instance, following gastro-enterostomy we have a type of the true adhesion.

Gerster says (*Annals of Surgery*, September, 1911, liv, 325): "The form of adhesions observed in certain cases of chronic enterocolitis is so different that in their case the use of the unqualified term 'adhesions' is unfortunate, because misleading. While true adhesions involve at least the serosa, which is then replaced by more or less organized connective tissue, which often extends to the muscularis and mucosa, thereby causing absolute fixation of the adjacent segments, these other so-called adhesions do not enter into a close organic union even with the serous coating of the gut. They can be stripped off without difficulty, and, after their removal, the intact and glistening serous coat of the intestine is exposed. True, they do adhere, but in a very loose manner."

Connell while writing under the title of "Ileocecal Adhesions" (*loc. cit.*, 488) quotes Lane, Jackson, and Martin, approvingly, as all agreeing "that these changes are not adhesions in the ordinary acceptance of the term."

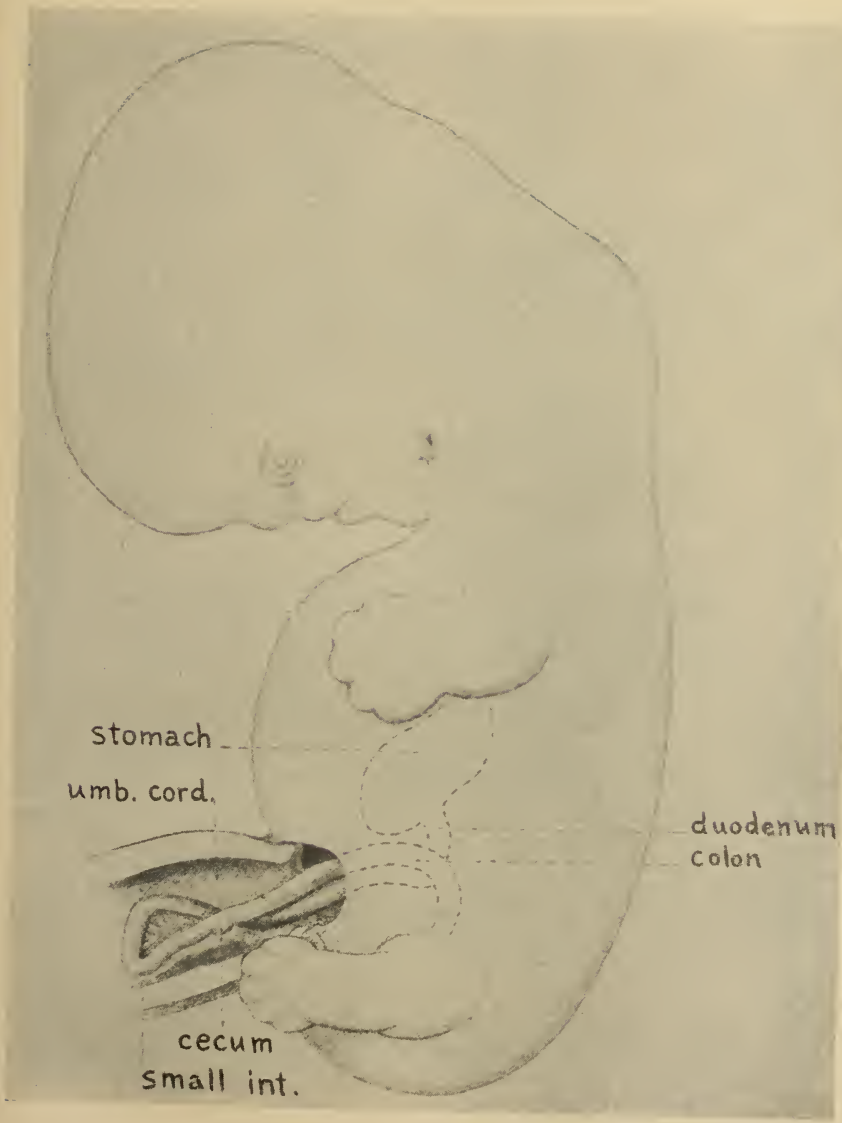


Fig. 1.—Human embryo, six weeks.

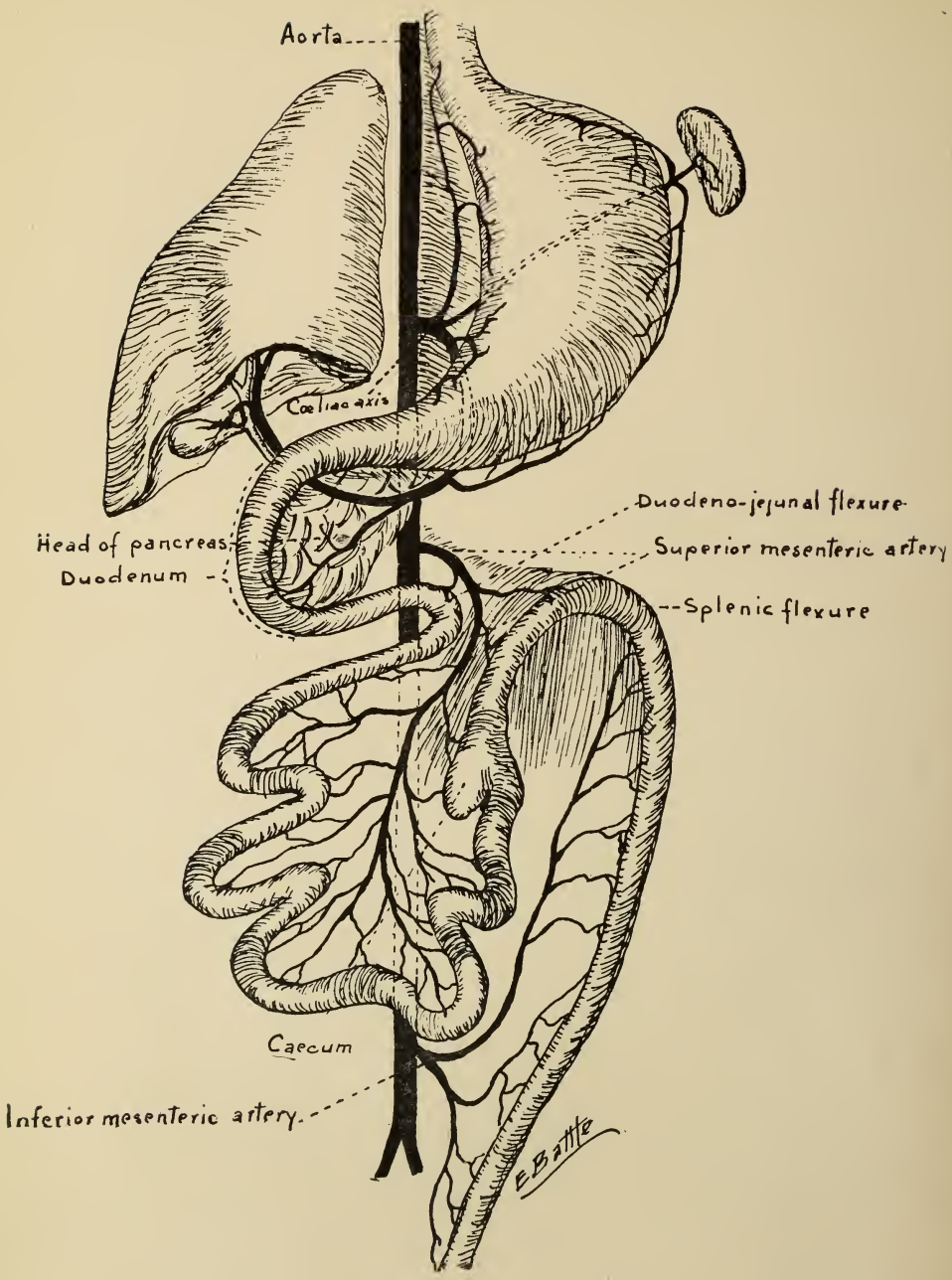


Fig. 2.—Second stage in the development of the intestinal canal.

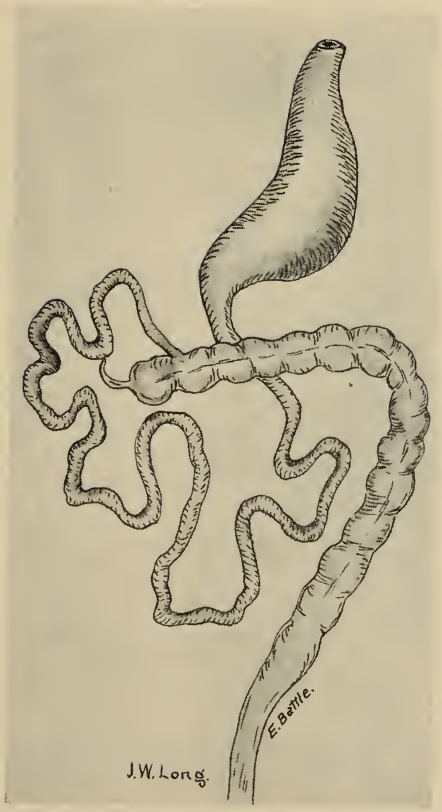


FIG. 3.—Rotation of colon.

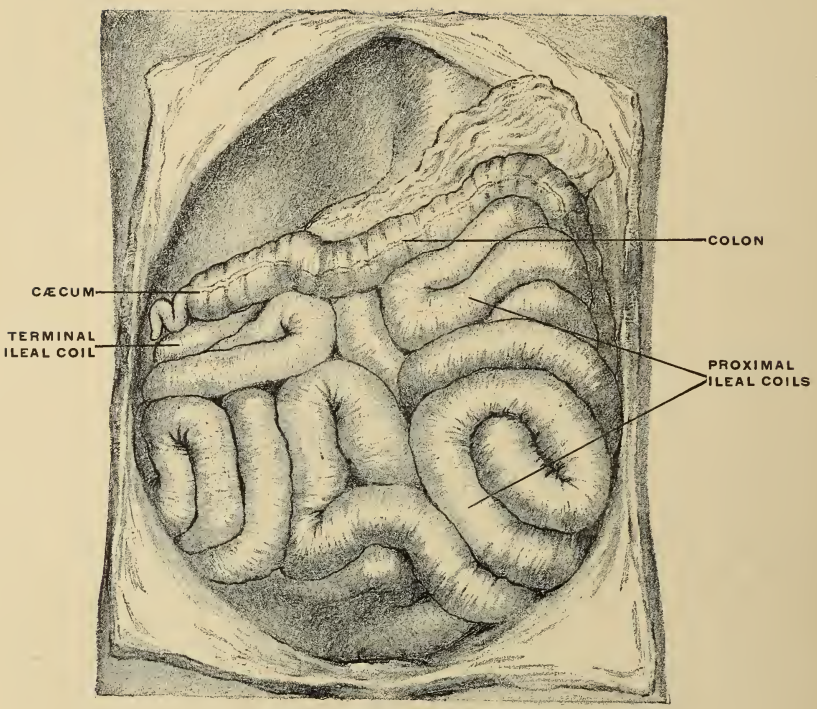


Fig. 4.—Cecum in its subhepatic position.

Frazier in a most carefully tempered article on "Lesions of the Right Iliac Fossa" (*Annals of Surgery*, October, 1912, lvi, 582), in speaking of Jackson's membrane says: "The membrane does not resemble the ordinary adhesions, in that it does not enter into close organic union with the peritoneum of the gut and abdominal wall; instead, it may be stripped off as a veil after which the serous coat of the bowel appears."

Other authorities might be cited to show that the pericolic membranes, or pseudoperitoneal cauls under discussion, are not adhesions in the true sense of the word.

Most writers refer to these membranous formations as "Jackson's membrane." While the name of the propounder of any pathological entity is in no sense descriptive, yet it is quite the proper thing to do in this instance, as an appreciation of Jackson's epoch-making paper, read before the Western Surgical Association in December, 1908, and published in *Surg., Gyn., and Obst.*, in September, 1909, on "Membranous Pericolitis," in which he describes, with much exactness, the membranous formations found about the colon, their pathological significance and treatment. The title of Dr. Jackson's paper was very happily chosen, since he was stressing the relation of cause and effect as well as the pathology and symptom-complex. Other writers have followed his example. For instance, Pilcher, in *Annals of Surgery*, January, 1912, lv, 1, in a splendid paper considers "The Surgical Aspects of Membranous Pericolitis." Robitshek has an article in the *Journal of Minn. State Medical Assoc.* on "Membranous Pericolitis," September, 1910. So has Crossen in *Surg., Gyn., and Obst.*, July, 1911.

It would be extremely bad taste to criticize the title of another's paper and these remarks are certainly not submitted in that spirit, rather it is the desire of the writer to clear away some of the confusion that has gathered around the nomenclature of the subject in hand. Let us be clearly

understood. Without reference to anyone's writings or to the terms ordinarily employed to designate the pathological findings, it may be said in all frankness, that if we were considering an inflammation around the colon, "pericolitis" is most assuredly the proper word, since, "colitis" signifies inflammation of the colon and "peri" means around; or "para," which means "by the side of," would be an admissible prefix.

Again, if stress be placed upon the resulting membranous formations as a quiddity, *per se*, the word pericolitis scarcely conveys the right idea, even though the qualifying adjective "membranous" be appended, since at the most it would only indicate the type of inflammation. As a matter of fact, when the surgeon sees the case, and the condition is sufficiently developed to be recognized, it is not an inflammation that he has to deal with, but a sequel; to wit, the membrane or caul; even admitting that inflammation plays a part in its causation. Furthermore, when we remember that pericolitis is only one link in the vicious chain leading up to the membranous formation it must be admitted that "membranous pericolitis" is no more descriptive of the actual condition found than would be "membranous splanchnoptosis," or "membranous intestinal stasis," or "membranous infection," either of which, less the prefix, is probably quite as important a factor in the development of the pseudomembranes as is the pericolitis. The only thing that could possibly be said in favor of using "pericolitis" as a part of the descriptive title of the membrane itself, is the fact that the local peritonitis is the link in the pathological chain that directly precedes the formation of the membrane. Even this close relation between pericolitis and the pseudoperitoneal membranes is not subscribed to by all authorities since there are those who go so far as to say that the membranes in question are not the result of an inflammation at all, but are due wholly to developmental errors (C. H. Mayo, "Intestinal Obstructions Due to

Kinks and Adhesions," etc., *Surg., Gyn., and Obst.*, xii, 227). Gray, surgeon in the Royal Infirmary, Aberdeen, says (*Jour. Am. Med. Assoc.*, lx, No. 5, 395) that all these membranes and kinks are of congenital origin.

The study of the proper term by which to designate this peculiar condition, which is exciting so much interest among surgeons and internists as well, leads us to inquire as to the causes of pseudoperitoneal cauls.

In order to get an intelligent conception of this question a comprehensive study of the subject with many of the correlated facts must be undertaken.

Much confusion may be avoided if we but bear in mind that there are four chronic conditions found in the right iliac fossa which have much in common in their etiology, pathology, and symptom-complex; namely, chronic appendicitis, the so-called Lane's kink, Jackson's membrane, and cecum mobile. While inextricably connected with all of them are certain developmental errors, splanchnoptosis, and intestinal stasis. So far the clinical differentiation of this condition has not been clearly written. We say to the patient you have one or the other; at operation we oftentimes find two or more of them present, the one directly inducing or making worse the other.

Radiography has been of signal service in the differential diagnosis of these conditions; but while bismuth mush and the *x*-ray are quite efficient, they are far from being sufficient.

To understand the matter we must review certain phases of the embryology of the alimentary canal which will give us a clue to much of the pathology found in the right iliac fossa.

As is well known, the intestines in the embryo at one time lie almost entirely outside of the abdomen in the capacious umbilical cord. This is illustrated very clearly by Mall and Brödel (*The Vermiform Appendix*, Kelly, 56). (Fig. 1.)

When the embryo reaches 40 mm. in length the intestines return to the abdominal celom (*Human Embryology*, Keibel and Mall, 1912, ii, 326). Having accomplished their retreat into the abdomen it is to be noticed that the colon is on the left side. Fig. 2, redrawn from Sobotta, indicates the position of the colon at this stage of its development. It also shows that the cecum, which, according to Grosser (Keibel and Mall, *loc. cit.*, 318), began to appear in the embryo at 7.5 mm., is well advanced by this time. The colon then appears to lift its cecal end, as it were, and project it across the midline of the peritoneal celum from left to right, until it lies transversely just underneath the liver. Fig. 3 shows semidiagrammatically this partial rotation of the colon. Fig. 4, after Huntington (*Anatomy of the Peritoneum and Abdominal Viscera*) is from the Columbia University Study Series. It represents the cecum in its subhepatic station, which it reaches about the end of the third month, according to Kelly, who relies on the dissection of fifty fetuses by Mall and Brödel. The rotation of the colon as just described and which really begins while it is yet within the umbilical cord is actually due, according to Huntington, to the rapid growth of the coils of small intestines, which displace the colon upward and to the right. The multiplicity and position of the coils would seem to justify this assertion.

The succeeding stage in the development of the colon involves the descent of the cecum, in front of the right kidney, to the iliac fossa. This transition takes place between the fourth and seventh month. When the cecum and adjoining colon (now called the ascending colon) reach their normal position they lie snugly against the posterior abdominal wall which is covered with peritoneum. As rotation proceeds fusion between the parietal peritoneum and the posterior layer of the colonic mesentery takes place, both of which layers are finally absorbed, thereby causing a portion of the colon, heretofore intraperitoneal, to become

extraperitoneal. The cecum and ascending colon are now firmly and normally fixed to the posterior abdominal wall. Fig. 5 (Kelly, *loc cit.*, 90) graphically illustrates, in part, the natural attachments of the cecum. See how securely it is anchored.

So much for the normal rotation of the colon. Now let's see what abnormality may occur. Suppose, for instance, the process of fusion between the peritoneal layers, which normally takes place *pari passu* with rotation, should occur before the cecum reaches the iliac fossa, say half-way down the line, then we would have a cecum located high up with an appendix lying on or near the kidney. We have all seen cases of this kind. Or, if fusion be far advanced while the cecum still occupies its subhepatic station, we have the so-called "absence of the ascending colon," which to my mind is simply an undescended colon due to premature fusion just as we see in Fig. 4.

Fusion of the visceral and parietal peritoneum is nature's method of fixing the colon and cecum to the abdominal wall. Sometimes this fails to occur, in whole or in part, even though their descent be as it should. In this instance the cecocolonic mesentery, which you know is normal during the first half of intra-uterine life, persists, allowing the cecum and ascending colon to swing free in the abdominal cavity as does the ileum. Treves, in 1885 (*The Anatomy of the Intestinal Canal and Peritoneum in Man*, p. 55), said, as a result of examining 100 subjects, that a mesentery was found in the cecum and ascending colon of 26. Treves' findings accord with, in fact, are even less, than those of other observers. In other words fusion does not take place in one person in every four. Why this failure of fusion? The reason is largely mechanical. You recall that before rotation was far advanced the small intestines occupied the entire right side of the abdominal cavity below the liver. Should one or more coils delay moving out of the way of the cecum and colon as they descend toward the iliac fossa, union of the

visceral and parietal layers of the peritoneum would be a physical impossibility; and this is what really happens. Fig. 6 is a side view from an actual case in the Columbia University Series, and gives us a clear conception of the mechanics of this condition. The results are (1) persistence of the colonic mesentery, and (2) a movable ascending colon, in whole or in part, and a movable cecum or so-called "cecum mobile." Fig. 7 shows the results following the conditions as found in the preceding figure. Fusion has occurred only as far down as the kidney, part of the ascending colon and cecum swing free, and in this instance the appendix was caught before it had descended from behind the cecum. I had a case of this kind recently that was even more exaggerated. The tip of the appendix sticking up in front of the kidney and behind the colon looked almost uncanny. Fig. 8, after Coffey, shows a pronounced cecum mobile. The unattached cecum is not only mobile but in ultra-marked cases may be said to wander. In a number of instances I have seen the dilated movable cecum lying on the bladder, covering it as snugly as a cap fits the head.

Thus we see how embryology explains pathology. The mobility of the cecum is largely responsible for the ills that follow. Take for illustration Lane's kink. This knuckling of the bowel as described by him may be congenital or acquired. The congenital variety is predicated upon two things: (1) the last several inches of the ileum are attached to the lateral pelvic wall by a normally short mesentery, which, by the way, is entirely distinct from that of the colon; (2) the cecum having failed to attach itself to the parietal wall, it is liable to become overloaded and topple over into the pelvis, carrying with it the last inch or two of the ileum, thereby producing a kinking at the point of its short mesenteric attachment (Fig. 9). Mr. Lane lays much of the blame for the kinking of the ileum upon "intestinal stasis," which is an euphonious name for the old-fashioned term "con-

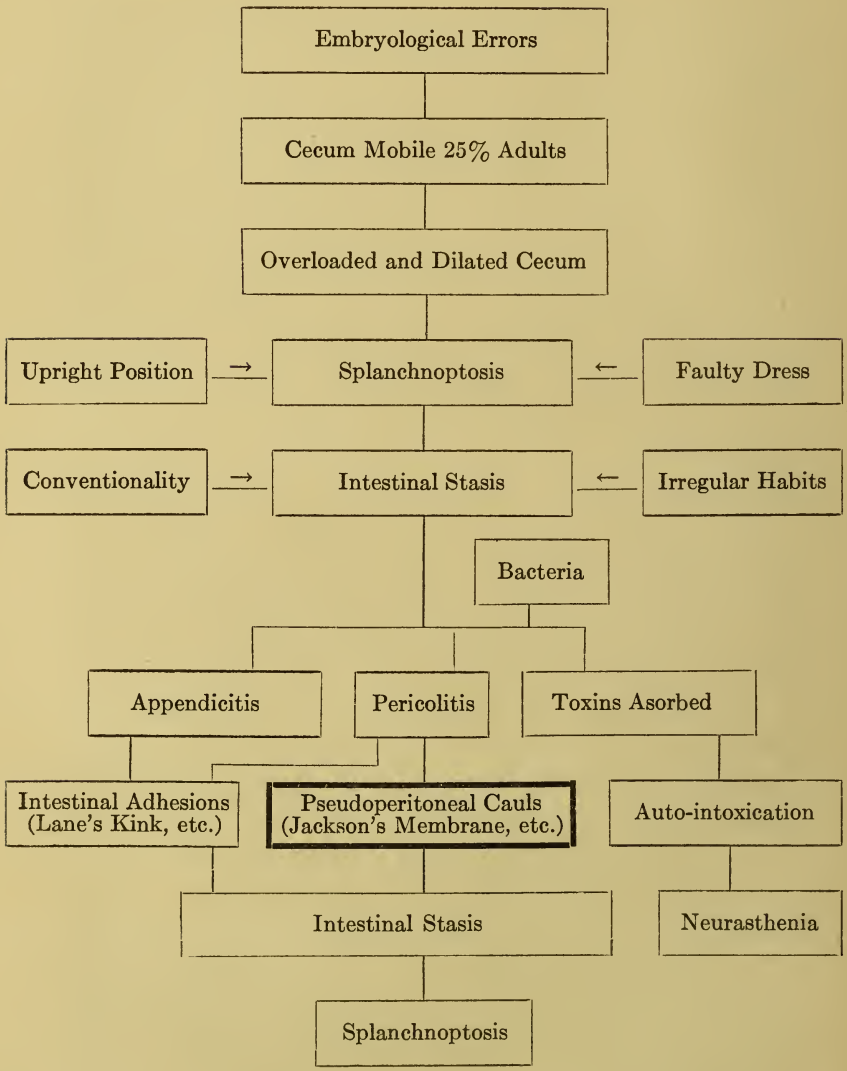
stipation" as the word is used in this country. According to his conception the upright position assumed only by man produces ptosis not only of the cecum but the entire colon, excepting perhaps the splenic flexure. Attention is called to the fact that the lower animals do not have constipation because, traveling on all fours, does not produce ptosis and not being hampered by the conventionalities of civilization they indulge in a bowel movement whenever the desire overtakes them. But we will consider this later.

Ransohoff in discussing the causes of intestinal ptosis before the Massachusetts Medical Society, says: "The first and more important of them, I believe, is the insufficient fixation of the cecum and of the lower part of the ascending colon."

We can readily understand how developmental errors cause movable cecum, how the upright position favors splanchnoptosis, and how the overloaded colon increases the ptosis; but we must go a step further if we would get a thorough conception of this subject, since much yet remains to be explained.

Additional facts regarding the cecum are its great capacity; it is the cesspool of the alimentary canal, and it is at all times teeming with bacteria, all of which facts favor infection of its walls both inside and out.

Physiology explains something at this point, since from it we learn that the food bolus is hurried through the small bowel, reaching the cecum in two or three hours. Here the first mass is delayed by virtue of the position of the cecum and half of the colon, the direction of the current, and the high splenic flexure which must be surmounted. While in this portion of the bowel the semifluid mass undergoes a process of being churned and kneaded back and forth, the so-called "haustral churning" (Cannon, "Functions of Large Intestine," Surgical Section, *American Medical Association*, 1912, 124), thereby preparing it for absorption, for as W. J. Mayo says, "we drink with our large bowel."



FROM EMBRYOLOGY TO PATHOLOGY

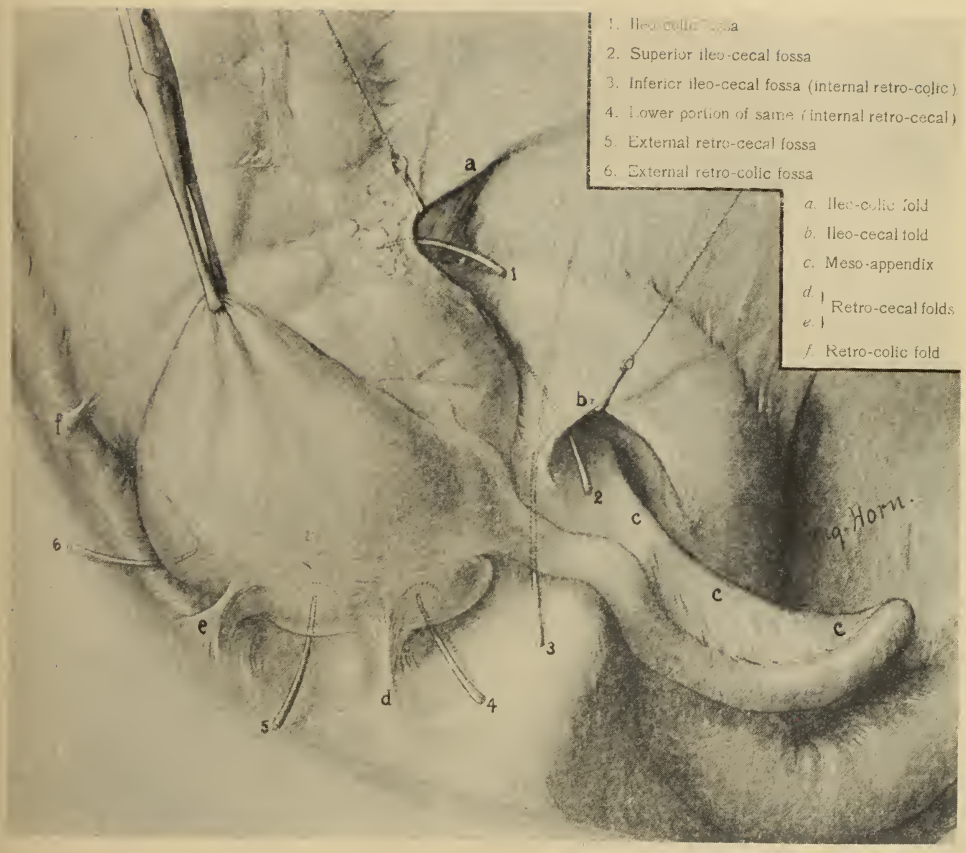


FIG. 5.—Natural attachments of the cecum.

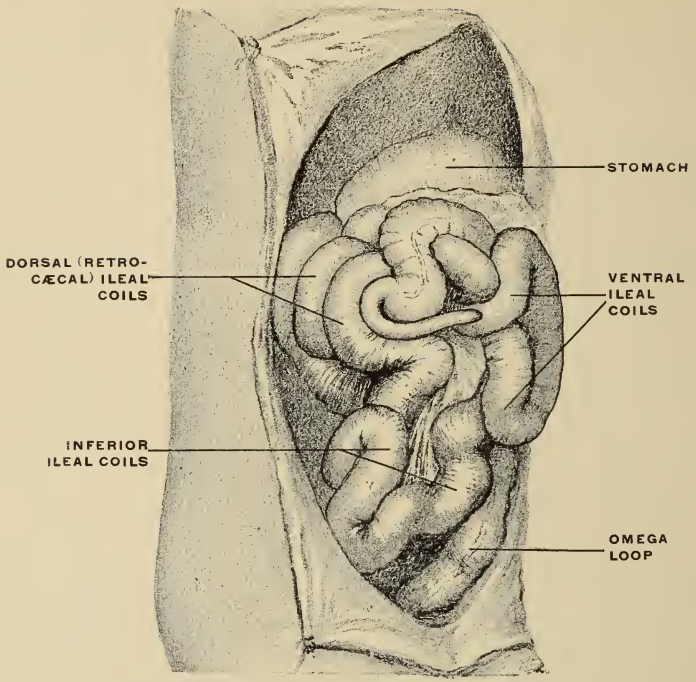


Fig. 6.—Side view of intestines in embryo.

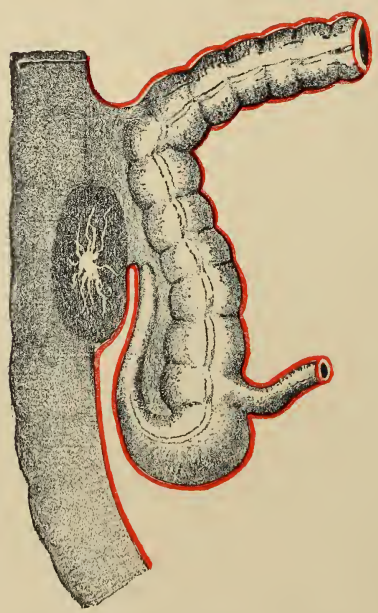


Fig. 7.—Partial fusion of colon.

FIG. 8.—Cecum mobile.

FIG. 9.—Prolapsed cecum, causing Lane's kink.

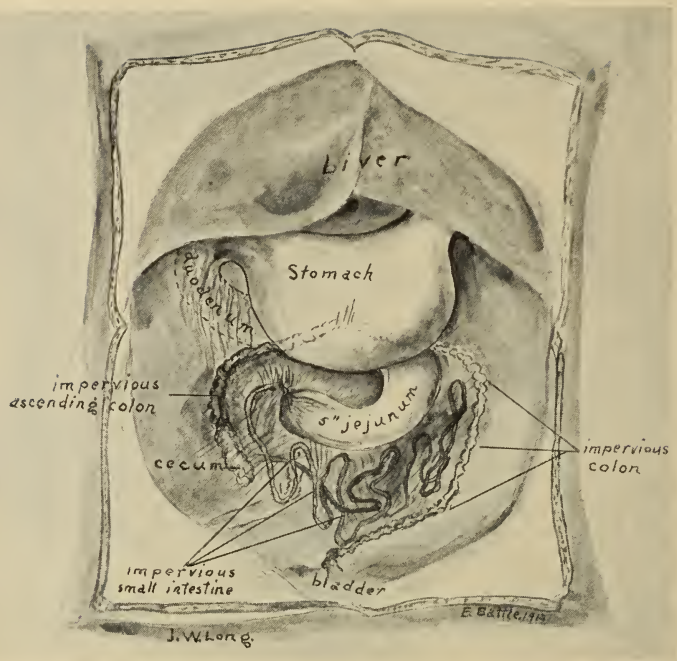


FIG. 10.—Impervious colon and small intestine, due to constricting bands.

While the cecum is normally the largest portion of the colon, it is often filled to its limit with feces, fluids, and gases, and readily becomes stretched, which leads to thinning its walls and that atonic condition called by Fischler "cecostomy" (*Mitt. a. d. Gren. d. Med. u. Ch.*, 1909, xx, 663). If the cecum be of the mobile variety, as we have seen is true in at least one person in every four, ptosis is almost sure to develop.

From this time on bacteria play an important role in the pathology that follows, since bacterial activity reaches its acme in this portion of the canal. Add to these conditions intestinal stasis, which by this stage of the game is usually well established, and we have a set of circumstances favorable to the development of two serious pathological groups: (1) from absorption of the toxins we get auto-intoxication with neurasthenia as a sequel; (2) from penetration of the bowel wall by the bacteria we get a local infection of the adjacent peritoneum.

As it is not the purpose of this paper to deal especially with auto-intoxication, we will follow only the steps incident to the local pathology. There can hardly be a question that bacteria may pass through the intestinal wall that is already in a pathological state. We give proctoclysis in peritonitis because we are taught (Murphy) that the salt solution put in the colon passes through the intestinal wall by way of the absorbents and constantly bathes the peritoneum. Proctoclysis always increases the discharge in drainage cases. Bacteria are more active, more penetrating than is salt solution.

The relation of bacteria to pericolic inflammation is extremely interesting. Prior to the work of Runeberg and Heyde it was commonly supposed that the colon bacillus was the chief cause of appendicitis and the resulting peritonitis. Their experiments show that the anaërobic organisms (B.thetoides, B. fusiformis VII, *et al.*), one or more varieties living in symbiotic relation, are usually the prime

cause, and that the colon bacillus is secondary. Hofmeister demonstrated the Tricocephalus dispar in the perirenal tissues, tracing them through the colon absorbents. In this connection the work of Helmberger and Martin (*Deutsch. Zeitsch. f. Chir.*, 1904, 527, *Exper. Untersuch. über. d. Durchgang. d. Darm. f. Bact.*) is interesting and exhaustive. These facts and numerous other experiments indicate that the intestinal wall is vulnerable to pathogenic organisms. Bacteria often reach the colonic peritoneum by way of the appendix.

Bacterial invasion of the peritoneum sets in motion that group of changes correctly called "pericolitis." First, the congestion, *irritatio ibi fluxus*. This is speedily followed by edema of the peritoneum, and finally by the formation of a well-organized pseudocaul or membrane, as well as numerous types of adhesions.

M. L. Harris (Surgical Section, American Medical Association, 1912, 145) has described these changes so aptly that I quote his words: "In the early stages of this condition the wall of the ascending colon presents the appearance of being thickened or edematous, and, on close inspection, the visceral peritoneum seems to be raised from the bowel wall by reason of the presence of a subendothelial hyaline-looking substance or exudate. The endothelial layer of the peritoneum, which is slightly movable on the bowel wall, gradually becomes separated from the bowel as a distinct layer, and beneath it, covering the bowel wall, there forms another layer of endothelial cells. A raised, thin, transparent membrane remains attached to the bowel at the longitudinal bands, at which point small bloodvessels may be seen entering and spreading over the thin membrane. Later this membrane is almost certain to acquire attachments to the anterolateral parietal wall. In older cases the membrane becomes thicker, particularly along the line of the bloodvessels, which also become larger and more numerous."

In tracing the steps of the pathology under discussion,

sufficient emphasis has hardly been given to Mr. Lane's views. I do not think any one has done quite so much as he in compelling the profession to recognize the tremendous importance of the pathology incident to as well as the treatment of intestinal stasis. But Coffey, who has written very elaborately and learnedly concerning the subject says (*Surg. Gyn., and Obst.*, October, 1912, 365): "Mr. Lane has failed to differentiate between prenatal and postnatal adhesions. While he has laid great stress on ptosis and the effect of the erect posture in producing the condition, he lays most stress on the effect of bands and adhesions. He has failed to tell us plainly what caused the bands."

By "prenatal adhesions" I understand Coffey to mean developmental errors, such as result from vicious fusion or the lack of fusion. I think his criticism of Mr. Lane's written descriptions is just, and, with Coffey, I only wish Lane had been more explicit. Perhaps after all he means just what we believe.

Pilcher (*loc. cit.* 3) says that, "As to the etiology of these films and bands, that view which considers them to be the result of long-continued or oft-repeated mild infections of the peritoneal covering of the cecum and appendix, transmitted through the intestinal wall, seems to me most probable."

Gerster says (*loc. cit.*, 332) "the peritoneum reacts to the infectious processes ordinarily associated with chronic colitis by the formation of characteristic vascularized membranes."

In striking contrast to the above opinions, Prof. J. M. Flint, of Yale University, has two papers in the *Johns Hopkins Hospital Bulletin*, xxiii, 268 and 302, in which he maintains "that these veils are embryonic and normal structures and not due to the organization of an inflammatory deposit or series of mild infections originating from a chronic colitis." He supports his contention with a number of dissections of embryos and infants.

But one can hardly agree with his premises or conclusions in their entirety. In the first instance, basing his opinion on his own experience and Smith's autopsies, who found 63 undescended ceci in 1050 cases, he makes the pericolic membranes, which he calls embryonic, almost synonymous with the prematurely fused, undescended cecum. In his conclusions he ignores the findings of most observers, to wit: that in the majority of cases of pericolic membranes they accompany a movable cecum, one that is underfused and not overfused. It will be interesting to see whether or not the dissection of a larger series of embryos than Flint examined discloses the same conditions.

Eastman, in *Surgery, Gynecology, and Obstetrics*, April, 1913, has a long and interesting article in which he describes the fetal peritoneal folds of Jonnesco, Treves, and Reid, and endeavors to show their relation to Jackson's membrane and Lane's kink. He and Alburger dissected 28 fetuses and found 5 instances of parietocolic folds. Reid found 3 in 20 fetuses. Evidently the purpose is to show that pseudoperitoneal cauls of the colon as seen in adult life have their origin in fetal life. However, Eastman adds it may safely be stated that not all anomalous membranes which have been designated as Jackson's membranes are persisting fetal folds.

It must be conceded that Eastman's paper and that of Flint's go a long way toward establishing the possibility of pseudoperitoneal membranes developing in the embryo and fetus.

The following case occurring in the writer's practice is evidently of the fetal variety.

January 1, 1907, Dr. C. S. Gilmer brought the eleven-day-old infant of K. L. C. for operation for imperforate rectum. There had never been the passage of feces or flatus. The abdomen was greatly distended and tense, dulness and marked fluctuation were present. The baby was vomiting a greenish-brown fluid with fecal odor at

frequent intervals. The vomiting began directly after birth and had continued ever since, the last twenty-four hours it had been very severe and frequent. The little finger could be introduced an inch and a half into the rectum where the bowel was closed and nothing could be passed further. After lavage, the abdomen was opened. The stomach, duodenum and proximal five inches of jejunum were enormously dilated, filling at least two-thirds of the abdomen. Fig. 10, while graphically showing the conditions found, does not represent correctly the enormous size of the distended organs, since the artist was asked to leave room to draw the remainder of the intestine. The transverse colon was caught mid-way and pinned high up beneath the stomach to the posterior abdominal wall by a broad, fan-shaped band of adhesions, making an absolute stricture; the same was true of the jejunum at the point where dilatation stopped. From this point throughout the aboral portion of the small intestine and colon they were reduced to practically an impervious cord, except that there was a slight dilatation of the cecum containing a small amount of fluid feces. Many friable films of adhesions crossed the intestines at numerous points. The conditions found suggested that the patient had suffered with a widespread peritonitis late in intra-uterine life, after the colon had rotated to its normal position. Whether or not the bands and adhesions found in this case come within the classification under discussion may be questioned. But the picture shows a prenatal case occurring after the descent of the cecum in which the entire colon and most of the small bowel were absolutely prevented from developing by the presence of almost universal membranous formations. That the exciting cause was not bacteria is shown by the fact that there are no bacteria in the alimentary canal of the unborn fetus.

Typical pericolic pseudomembranes or cauls are peculiar and characteristic and their relations to the colon very

1896, and appears in its *Transactions* for that year; the paper was also published in the *International Journal of Surgery* for December, the same year.

The illustration was intended primarily to show the constricted portion of intestine (*a*). At the same time it was my desire to call attention to the peculiar membranous formation covering the appendix, cecum and ascending colon. This was clearly my purpose since the condition is especially mentioned in the foot-note of the illustration (*b*), and the context calls particular notice to the same thing in the following words: "The appendix was buried in a mass of adhesions, and a veil of well-organized adhesions containing many bloodvessels covered the lower part of the ascending colon" (supra).

If apology for the rather rough appearance of the illustration were necessary I might say that this drawing was made nineteen years ago (1894), by myself as I recall. It can readily be seen that I am not an artist; indeed, that was before the days of the artist in surgical illustrations. Therefore, as a work of art my crude drawing does not compare favorably with the beautiful pictures of the same condition we are so frequently regaled with in these latter days. That it illustrates, is evidenced by a recent letter from Dr. Jabez N. Jackson, to whom I sent a reprint of the 1896 paper, with a marginal note by the side of the cut saying, "How is this for a Jackson's membrane?" A prompt and courteous reply contained the following words: "There is no doubt that you saw the real thing."

In reply to a letter of inquiry Dr. Geo. J. Tompkins of Lynchburg, Va., who has kept in touch with the patient whose case I have just reported, writes under date of December 2, 1912, a long and interesting letter, giving somewhat in detail the post-operative history to this time. According to Dr. Tompkins the patient has gone through vicissitudes that would excite the envy of a novelist, yet in the end he recovered from his abdominal maladies, his drug addiction

FIG. 11.—Jackson's membrane.

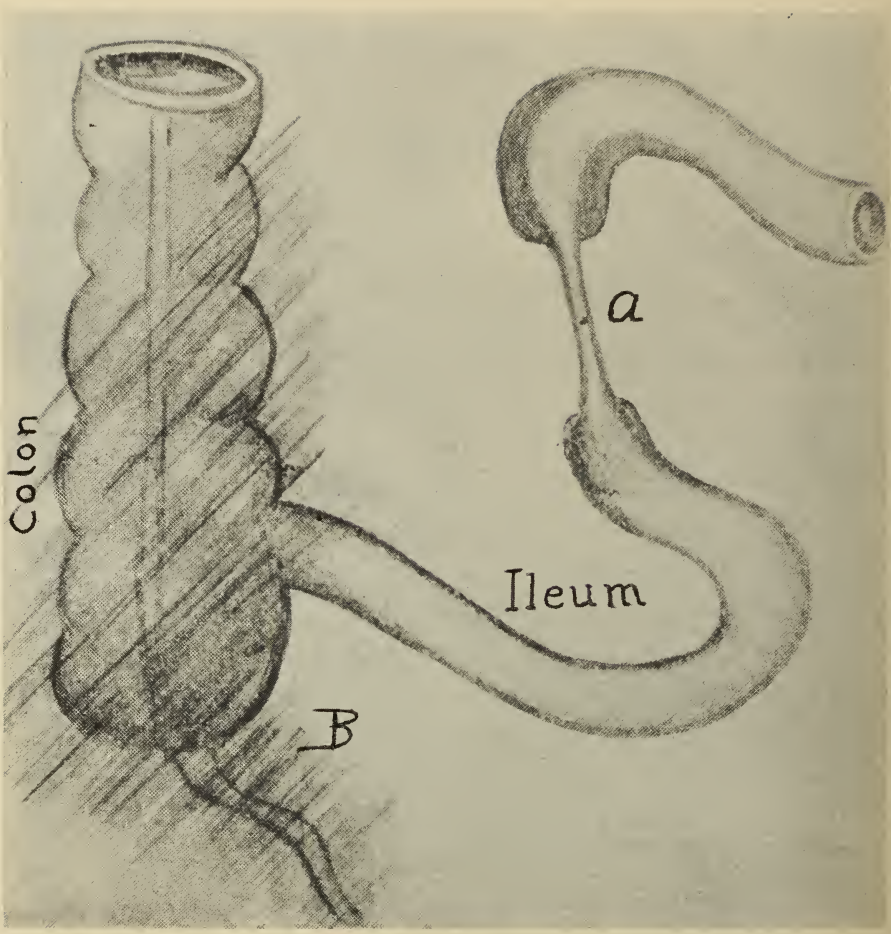


Fig. 12.—The appendix was buried in a mass of adhesions and a veil of well-organized adhesions containing many bloodvessels covered the lower half of the ascending colon.

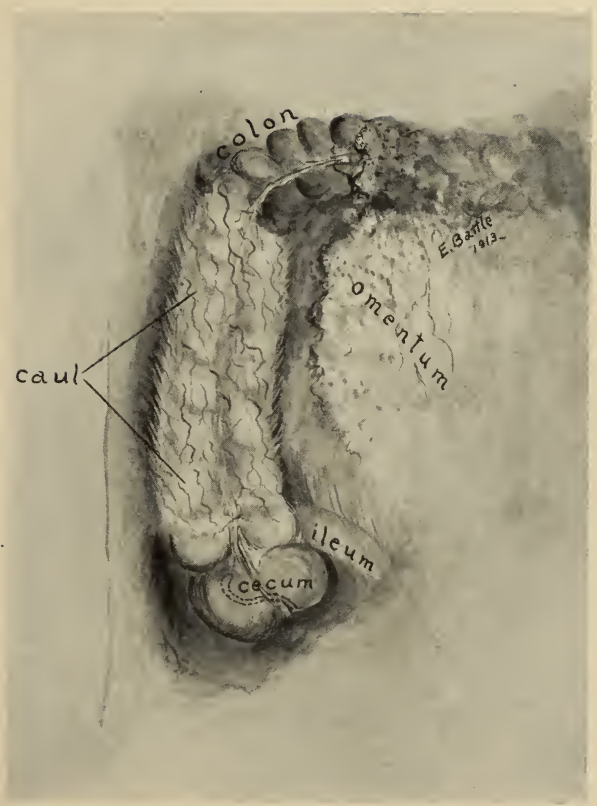


Fig. 13.—Pseudoperitoneal caul of the colon.

and epileptic seizures. For a number of years past he has been running a large farm, a cannery, filling the position of commissioner of internal revenue, etc., all of which certainly require much bodily vigor.

In the writer's experience the conditions most usually observed at operation may be illustrated by the findings as shown in Fig. 13.

The patient was a girl, aged twenty years. Of course she had a cecum mobile. The appendix was five inches long, subacutely inflamed, bulbous at the end and buried high behind the cecum. The caul covered the entire ascending colon, being attached to the lateral abdominal wall and to the peritoneum, just internal to the colon. It had no colonic attachments, not even to the longitudinal muscular bands, except at its upper and lower limits, where it was continuous with the peritoneal covering of the colon. The pseudocaul was transparently thin and contained many large branching bloodvessels which ran parallel with the gut. I cannot compare this veil-like membrane to anything more similar than those parts of a dog's omentum which are free from fat; the difference being, the omentum is composed of two thicknesses of peritoneum while the pseudocaul consists of only the endothelial stratum of one layer of peritoneum, with perhaps a macroscopically invisible base. The colon in all its details could be clearly seen through the membrane which was readily lifted from the surface of the colon by seizing the membrane with forceps and making gentle traction.

In this instance the pseudoperitoneal caul was not removed because, forsooth, it was in a measure supporting the movable colon.

These cases occur with surprising frequency, two of them being seen in the writer's clinic in one morning.

Pseudoperitoneal membranes or adhesions had been discussed even before my paper in 1896. Bevan (Surgical Section, American Medical Association, 1912, 135) collected

numerous papers along this line; among them (1) Riedel, who in 1894 (*Arch. Klin. Chir.*, xlvii, 1533) reported several cases of chronic colic resulting from inflammation of the abdominal cavity; (2) Lauenstein, in 1893 (*Arch. Klin. Surg.*, 1893, xlv, 121), contributed a paper on adhesions and bands in the abdomen as a cause of colic, and quotes Madyl who wrote on the same subject in 1889, and Credé who in 1887 reported three similar cases before the German Surgical Congress; (3) Virchow, in 1853 ("Study of Abdominal Affections"), called attention to adhesive circumscribed peritonitis about the colon, especially at the hepatic and splenic flexures and sigmoid, and said they resulted from fecal stagnation.

In reference to the treatment of pseudoperitoneal cauls, I say frankly, that I have caught the surgical enthusiasm for removing all such abnormal formations, but I hesitate a long time unless it appear quite certain that the adventitious membrane is hampering the colon or impeding its functions in some way. In fact, it is quite plain to me that the pericolic membranes may, under certain circumstances, serve a useful purpose. This occurs in two ways: (1) in limiting the spread of infection, during their formation period, just as adhesions about an inflamed appendix hinder the spread of peritonitis; (2) when they are adherent to the lateral abdominal wall of the colon they tend to restrict the ptosis of the colon and cecum and in this way take the place of the deficient peritoneal fusion that normally holds them *in situ*. The "jolly mariner" may have been justified in trusting in his caul. Adhesions about an appendix may subsequently cause an ileus by kinking a coil of intestine or strangulating a section of gut, so may pseudoperitoneal cauls become obstructive and a menace. But mark you, the pseudocauls are only one link in the pathological chain and their removal does not always cure the patient. Even though correct diet and paraffin oil be added to the treatment, a large per cent. of these patients

persist in being neurasthenics with their constipation, foul breath, sallow skin, etc.

While preparing this paper I received a letter from Dr. J. Allison Hodges, who runs a sanitarium exclusively for neurasthenics, saying he had a young lady under his care on whom I had operated eight years ago and he desired to know my findings at the time of operation. I recalled the case clearly, and, without going to my records, was able to tell him that she had a typical pseudoperitoneal caul (Jackson's membrane) which I removed. She was a neurasthenic before the operation, she has been one ever since. No better evidence that ablation of the membrane alone does not always cure these patients can be adduced than the fact that Mr. Lane removes not only the membrane but the entire colon as well. Coffey (*Surg., Gyn., and Obst.*, October, 1912) says: "In dealing with pericolic membranes, so well described by Jackson, I think we are justified in saying that simply cutting it away is a very primitive and incomplete operation." In dealing with my first case I did just what Jackson did with his first case a number of years later, *i. e.*, observed the condition, made a note of same, and let it alone. In addition I made a careful drawing of the adventitious membrane.

Gerster (*loc. cit.*, 342) reports five cases, in one of which "the membrane was left intact—uneventful recovery."

Flint says, "by far the best treatment in the majority of cases will be to let them alone." In the larger percentage of my cases the membrane is left undisturbed.

I may be allowed to say, not in a boastful spirit however, that as a matter of comparison a report, *nineteen years after operation*, as in my first case, of some of the cases in which the pseudomembrane was so conscientiously ablated, would be interesting. While I sound this note of conservatism against indiscriminate removal of pseudoperitoneal cauls of the colon, expecting thereby to accomplish a cure in every case, per contra, it is unquestionably true that numerous instances are seen in which marked relief is afforded by

removal of the constricting membrane, particularly if the operation be followed up by proper diet, gymnastics (Martin), and careful regulation of the bowel movements.

Oftentimes with ablation of the membranes must be done one or more of the various operative procedures for overcoming the splanchnoptosis and retrenchment of the dilated movable cecum.

Always it must be remembered that the formation of pseudoperitoneal cauls, no matter at what point along the line of the colon they may be situated, is only one step in the development of the embryo-pathological process, and *the rational treatment of the membranes involves due consideration for the steps which led up to their formation and to those which result because of their presence.* The diagram presented herein is a good picture for the abdominal surgeon to get fixed in his mind. The memory of the interlocking of the various links in the chain of events will prevent him from putting too much stress upon any single one of them.

DISCUSSION ON THE PAPERS OF DRS. BORDEN, SCHACHNER, BROWN, BLOODGOOD,[1] AND LONG

Dr. J. Shelton Horsley, of Richmond, Va.—It is rather unusual to find connective tissue regarded in such a different manner by surgeons, when it forms bands or kinks about the colon or the lower part of the ileum from what they regard it elsewhere. For instance, a great many people seem to think these bands are due solely to some protective influence, and that they are nature's efforts to support something. Most of them, at least a good proportion of them, are connective tissue bands — scar tissue — and tend to contract. In general, we have these so-called protective bands in cirrhosis of the liver, but we do not consider them a beneficent process there. We have these bands causing stricture of the urethra, Dupuytren's contraction, etc. They are simply scar tissue and when they give trouble ought to be removed.

[1] The paper of Dr. Bloodgood was not received in time for publication in the Transactions.

In regard to the technique, there are one or two little points many of you may have used, but I have not seen them decribed elsewhere. It is difficult sometimes to maintain asepsis when opening the lower part of the ileum. This bowel is always very septic, and even when a small amount of sepsis is taken care or by the abdominal cavity, we are likely to have infection of the abdominal wound. In doing the operation of transplanting the ileum into the sigmoid without resection of the colon, of course we have to do practically always a side-to-side anastomosis. I have been in the habit of putting a rubber-covered clamp on the ileum about twelve inches from the cecum and then stripping with the fingers the fecal matter to the cecum where another rubber covered clamp is placed. About half way between these clamps two Ochsner clamps are placed rather close together. Before anything else is done a purse-string suture is inserted around the bowel about an inch back of each Ochsner clamp and is left untied. With the cautery the bowel is cut in two between the Ochsner clamps and the mucosa is disinfected with the cautery. Then with iodine catgut a through-and-through suture is run through the stump that is left and tied as the Ochsner clamp is gradually loosened. This prevents the escape of fecal matter. The purse-string suture is then tied as the end is tacked in without any reasonable possibility of contamination. The other end is treated in the same way and brought over to the sigmoid for the union.

In regard to end-to-end anastomosis, it seems that it is not popular, as leakage often takes place at the mesenteric border. The manner in which these resections are usually carried out is to cut the bowel by starting from the convex border to the mesenteric border, so carrying sepsis into the triangular area, and infection takes place and the tissues break down. To avoid this, before the lumen is opened, cut the mesentery up to the bowel, clamp it and tie it, and then open the bowel, and in this way there is no chance of infection of the little areolar triangular space.

Dr. James E. Thompson, of Galveston, Texas.—In discussing the paper of Dr. Borden on the abnormal position of the cecum, I should like to make some observations. The frequency of the abnormality has been much underrated by the writer. As a matter of fact it is of very frequent occurrence and is constantly coming under our observation.

The cecum may occupy any position from its primitive one in the left hypochondrium along the track of its passage to the right and downward to its permanent place in the right iliac fossa. I have frequently found it under the gall-bladder.

In 1893 I reported a case (*Med. Chron. Manch.*) of fatal perforation of the cecum in the course of typhoid fever, where the cecum lay in the left hypochondrium. There was no ascending and no transverse colon. A few months ago a remarkable case of abnormality came under my observation. While operating on a woman through a right rectus incision, I was unable to find the cecum in its usual position. After enlarging the incision I was able to make out the following state of affairs. The cecum lay in the left hypochondrium. From it the colon coursed obliquely toward the right hypochondrium, thence down the right lumbar region into the iliac fossa. Here it formed a distinct sigmoid flexure and passed into the pelvis over the right ovarian vessels where it formed the rectum. The left lumbar region and iliac fossa were empty.

The lower end of the small intestine was traced into the cecum with difficulty and rather imperfectly. It passed upward parallel with the part of the colon lying in the right lumbar region, then coursed parallel to the transverse portion of the colon. Here is dipped deeply into a mass of thickened omentum that seemed to be clumped around this part of the gut. I followed it until about two inches from the left extremity of the cecum but abandoned its further exposure because of its intimate relationship to some very large bloodvessels. The cecum seemed to be rolled up in omentum and the appendix could not be found. In this case there was no transposition of viscera. An attempt to make a satisfactory *x*-ray picture afterward was a failure.

Dr. Charles H. Mayo, of Rochester, Minn.—I was very much interested in Dr. Borden's paper. I have in mind six cases of complete failure of the colon to rotate which occurred in our experience. In these cases the appendix and cecum were found on the left side of the body, in only one of the cases was the diagnosis made before operation. With appendicitis in these cases the pain is generally in the region of the navel, possibly diffused but quite as much on the right side as on the left. On making the usual incision and finding the small intestine the incision is carried upward and the duodenum uncovered which shows the position of the colon and its failure

to rotate, as well as the congenital position of the cecum. Normally the colon is under the stomach at the fourth month. It is under the liver on the right side just before birth. Treves claims that a child may be two years of age when it assumes the erect position, before its liquid contents produce enough gravity and weight to bring it down toward the iliac fossa. Cunningham states that it assumes this position before birth. In two of our cases the appendix was adherent to the gall-bladder.

In regard to Dr. Bloodgood's paper. We have used his method of anastomosis of the colon and in the removal of tumors. It is a safe method. As regards putting the ileum into the colon. I believe it can be done satisfactorily by several methods.

Dr. Henry T. Byford, of Chicago.—I was very much impressed with the paper of Dr. Brown. I consider his suggestion is an improvement upon previous work. Mr. Lane began by suggesting the removal of the colon. Now he has, I believe, come down to short circuiting. Now we are also discussing the value of resecting a part of the colon and drawing the rest straight. The progress is toward conversatism. But we should remember that the colon is something different from the appendix. The human being is already pretty well developed and with his development the appendix, being useless, has become atrophic. But the colon has remined active and voluminous during our evolution and development. It must be performing some useful function or it would have become more atrophic. The idea of Dr. Brown, not to exclude the colon but to temporarily put it at rest and later restore its connection and function, is another step in a conservative line. There are, of course, cases in which the colon should be removed, but its removal is too serious to be classed with appendectomy and circumcision, and we must be content for the present to develop our treatment in the line of taking care of it rather than removing it.

Dr. J. Wesley Bovée, of Washington, D. C.—This series of papers has been wonderfully interesting. They have given us the greatest amount of food for thought and digestion and proper assimilation.

As to the danger of infection in end-to-end anastomosis of the intestine, I would like to call attention to the use of Downes' electro-thermic angiotribe as a means of having an absolutely sterile field in doing this operation. This instrument can

cross the intestine; the larger clamp will give you a ribbon, in which the intestine is entirely closed and sterilized by cooking, ¾ of an inch wide, which can be divided across, and you have closed ends and a sterile field. Then by suturing them over one to the other, as you can, you have complete union under aseptic precautions, and by doing a sort of inversion with the finger at one end. and then the other on the ribbon when united, you may restore the caliber of the intestine at that point, with all of the work having been done in a clean field.

Dr. Joseph Ransohoff, of Cincinnati.—There are only two points I wish to call attention to that have not been mentioned. One of them is, we very often find in cases of coloptosis and gastroptosis, where any switching operation has been done, part of the colon is relieved without the gastroptosis. We know that the gastroptosis can right itself, but it may not go back to its natural condition. Therefore, I think in an operation made upon the colon for stasis one ought to think of gastroptosis.

There is one other thing I would like to call attention to that has not been mentioned, namely, that no one seems to pay any attention to the splenic flexure of the colon in this consideration, which is the most fixed part of the colon, and is a part of the colon that rarely descends. In reality, functionally we almost have a valve formed at the splenic flexure of the colon, and this valve is so well marked in its function that we can see in the skigrams here where the bismuth ends. Here is the descending colon (indicating) emptied, practically, and all bismuth, until it is ready to be discharged into the descending colon, is mantained in the transverse colon, and partly, of course, in the cecum. In all these operations, except the switching operation, we do not get rid of the excessive valve function of the splenic flexure of the colon.

I am thankful to Dr. Mayo for telling us that we should pay more attention to conservatism in dealing with these cases. I know of a death that occurred not long ago from a switching operation. These deaths occur frequently if the operations are done by inexpert operators, as operations will be performed by them, and death will occasionally occur in the hands of expert operators.

There is one operation that is simple and cannot do much harm, and that is the original hammock operation. I have in

mind a most successful case in which I suspended the transverse colon away up and with it suspended the stomach. That patient has been doing well for years.

I agree with the remarks of Dr. Mayo that we should be exceedingly careful in advising a major operation, and the hammock operation is to be advised because it does away with the excessive valve function of the splenic flexure of the colon.

Dr. Felix E. Balridge, of Huntsville, Ala.—The large bowel is so important as regards fluid, I would like to know what the after-effects would be on the kidney from the removal of the large bowel.

Dr. Borden (closing the discussion on his part).—From all I have heard advocated in this discussion as to removal of large parts of the large intestine, it would seem unfortunate, perhaps, that the fetal type which I described does not persist in all adults to prevent the necessity of these large operative removal operations.

Unfortunately for patients who might be saved these operations, I am of the opinion that it is a type of anatomical abnormality that is comparatively rare. It was this point I wished particularly to bring forward, as most of the ordinary anatomical statements made are, I consider, more or less inaccurate. For instance, such an unqualified statement as this is made in certain text-books, *i. e.*, that there are 8 per cent. of undescended cæci. It appears from what Dr. Mayo says in his discussion that at St. Mary's Hospital they have had six cases of non-rotation of the cecum. He did not say definitely how many cases he had seen with absolute absence of the ascending colon. If Dr. Mayo has seen such cases, I wish he would tell us about them.

Dr. Mayo.—We have seen cases in which the ascending colon has become a part of the transverse colon.

Dr. Borden.—In the cases I reported there was no ascending colon at all. The rotation was complete. The ileum enters the transverse colon at a right angle. The cecum was very short and represented only by a transverse distal dilatation. In these cases the appendix lies behind the cecum or in some cases in front of it. It is the true fetal type represented by, I think, the fourth month of intrauterine life. I did not present any other of the many abnormalities of the large intestine, but this one particular variety in which there is absolutely no ascending colon whatever and which I believe rarer than the

ordinary description as given in text-books would indicate, but as it occasionally occurs it should be remembered as a possible complication in diagnosis and operation.

Dr. Schachner (closing the discussion on his part).—I was pleased to hear Dr. Bloodgood emphasize the importance of taking care of the two intestinal stumps, as it is not always as simple a procedure as the descriptions would lead us to believe, *i. e.*, simply putting a purse-string suture around and turning it in, etc. I was glad to note that there was some Lane material in his remark about getting rid of the cecum. Radiographers tell us about the retention of the cecal contents for a long time. I think it can be explained more reasonably on the basis of the inability of the cecum to lift its contents uphill than on the ground of retention for a long time, with the view of withdrawing the last particle of nutrient material that may be present. Perhaps nocturnal recumbency is an explanation of the morning stool. The patient being in the recumbent posture during the night, the material moves onward after it has passed the cecum and ascending colon. One cannot help but feel that there is something wrong with the large intestine, and after the many procedures that have been advocated we have yet to find the solution. I think, in some cases, it will be necessary to take all or part of the bowel out. Much remains to be worked out through further experience.

In regard to the point made by Dr. Mayo, on evolution. If he will read Wiedersheim he will find that while we have advanced, the advancement was not a perfect one, and there are many defects, of which I mentioned a few prominent ones.

In regard to the remarks made by Dr. Ransohoff, if he will read Lane's article, *Brit. Med. Jour.*, April 22, 1911, he will find stress has been laid upon the splenic flexure. It is impossible in twenty minutes to fully cover the entire field. I mentioned the two papers that I thought would convey the desired information.

With reference to plicating the cecum, I doubt the good it can do, as plications are usually only temporary. That has been proved in other places.

Dr. Bloodgood, (closing the discussion on his part).—I am inclined to think that the surgery of the colon for lesions less definite than cancer or acute obstruction from non-malignant diseases, such as volvulus and diverticulitis, is going to proceed very slowly, because the resection of the colon, whether it is

one-half or all of the colon, or an ileocolostomy, except in certain selected cases, will not yield the same uniform results as we get following resection of the colon for cancer. I do not know just how to explain that, but if we resect the colon for cancer and our patient recovers, I do not feel that the patient is going to be any different than a patient with a colon. Whether we take out a small block or half the colon for cancer, you will find the mortality is less when you take away half of the right colon than when you take off a small block, on account of the mechanics of suturing, but you will find these individuals are no different from those who have their colons. So far as I can see from my observations of resection of the colon for cancer of the sigmoid, or the colon for diverticulitis and other lesions, there is no contraindication for resection of a large part of the colon. The question is to find out what are the indications for resection of the colon with other lesions.

I must confess, when I gave out the title of the paper, I expected to cover the surgery of the colon, but I have presented that paper to the Mississippi Valley Medical Association, and I learned then it was entirely too large a subject to tackle for one night. It would give the wrong impression.

I have tried to show a small group, and I introduced the question by stating we find a small group of cases we have failed to cure by ordinary methods. There are some individuals who have no gallstones, or gastric ulcer, or appendicitis, or diverticulitis, or any of the usual lesions of the gastro-intestinal tract, yet who suffer from certain definite symptoms. There is no question about that. The only interesting point for investigation is whether we can select from this group of individuals and by investigation find out what the lesions are and divide them into different groups, and then resort to some operative treatment which will accomplish a cure.

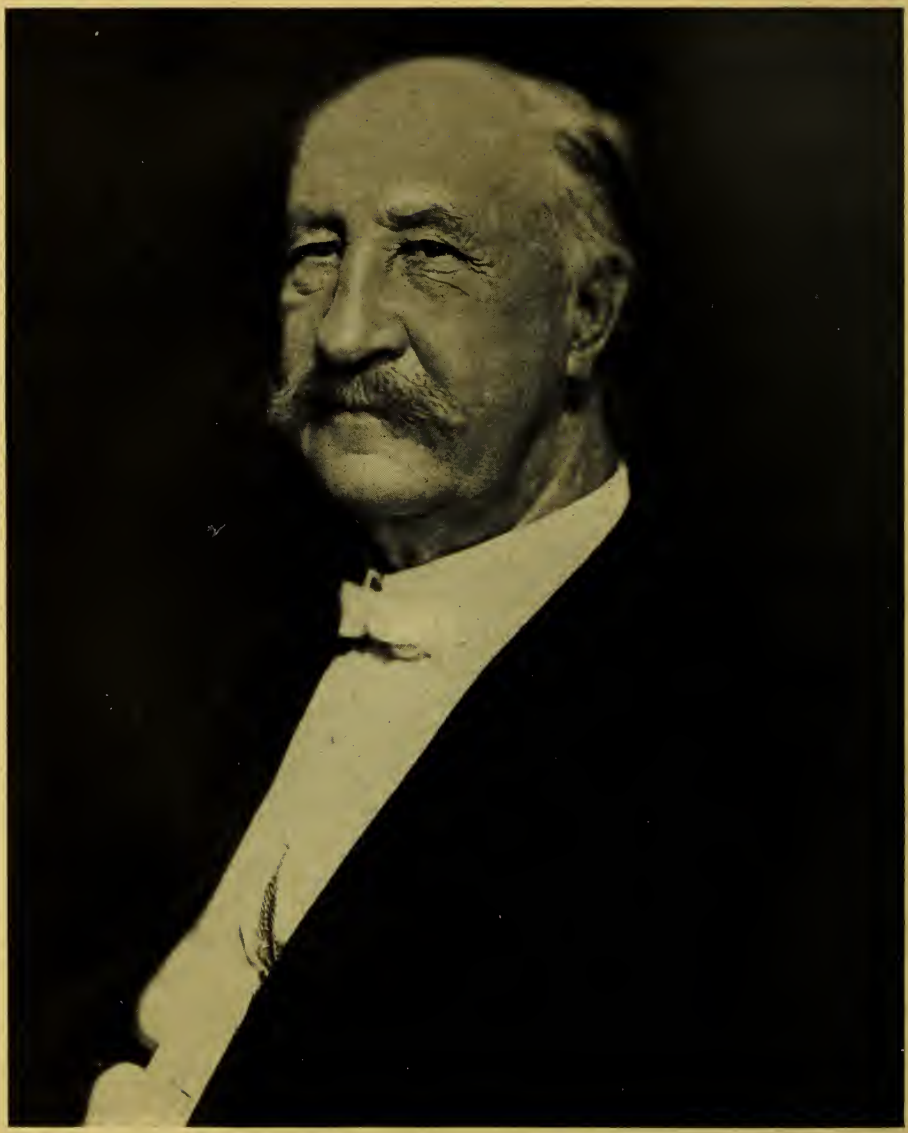
Dr. Mayo asked whether those cases in which I resected the right half of the colon for these symptoms had any change in nutrition. He would not have asked that question if I had resected the right half of the colon for cancer.

Dr. Mayo.—I meant before the operation.

Dr. Bloodgood.—That is what they were operated on for. There was the same condition as in a patient with pyloric stenosis. If they did anything, they vomited. They were operated on for the relief of their gastric symptoms. Any gastric operation will relieve gastric symptoms, such as resection

of the stomach or anastomosis between duodenum and jejunum. In this definite group of chronic mesenteric ileus, I did not resort to resection of the colon, but I know it is a definite clinical entity. There were six cases with no mortality. One patient was explored many years ago. One patient was operated on recently by a colleague in which he did the Finney operation and the patient died. These patients have been relieved. They do not vomit. They have no gastric residuum. They have gained in weight from twenty to thirty pounds. They are just as well as they were before they had their gastric symptoms. They do not suffer from constipation, and they are stronger. That I think is a definite group. Then there is a group in which there is a pyloric kink. There is a group of the sigmoid which Dr. Royster will discuss tomorrow morning, which is perfectly definite. The most definite group is the one in which there is ptosis of the colon, with chronic constipation, invalidism, but no gastric symptoms, in the sense of any gastric residuum, and no trouble with the sigmoid. That is the most difficult group of any to know what to do with, and I think we are indebted to Dr. Brown for a very important contribution. I am quite confident in one of my cases, which I did not operate on, that exclusion of the colon in a certain group of cases who are desperately ill as a preliminary operation by the method which he describes is going to have a definite place in surgery. Take individuals dying with acidosis, no medical treatment helps them. I have seen them die. There is no residuum in the stomach, although they may vomit at times. I am quite confident exclusion of the colon will save these patient's lives temporarily, and after that we may restore the continuity of the ileum and colon, and if the symptoms recur something else will have to be done. I believe the exclusion of the colon according to the method described by Dr. Brown will have an important place in surgery of the colon, in that it is better than appendicostomy or cecostomy.

Dr. Brown (closing)—Two or three years ago I reported two cases in which the entire colon was thrown out of commission for periods varying from twelve months to two years. Dr. Wm. Engelbach, my associate, and I, went over these cases carefully with the idea of determining the effect of complete exclusion of the entire large bowel on the quantity and quality of the urine excreted. These investigations showed that there was slight, if any, deviation from the normal.



J. B. MURFREE, M.D.

IN MEMORIAM

JAMES BRICKELL MURFREE, M.D.
1835–1912

By W. D. Haggard, M.D.
Nashville, Tennessee

Dr. J. B. Murfree, an honored member of the Southern Surgical and Gynecological Association, since 1891, died of cardiovascular disease, April 24, 1912. He was a physician of "the old school" and exemplified all of its noble qualities, courteous demeanor, high ideals, as well as the chivalry of the old South. He had lived a life of rare usefulness in the community in which he was reared and typified perhaps more than any modern member of his profession, the combination of citizen, friend, physician, and surgeon in close touch with the home and in authoritative relationship to high civic activity. He did a tremendous general practice, combined with a considerable amount of general surgery. Probably no physician of his time visited more patients than did Dr. Murfree.

He was greatly honored by his professional brethren. He had been President of the Tennessee Medical Society; President of the Middle Tennessee Medical Society, and President of the Tri-State Medical Association of Georgia, Alabama, and Tennessee. He was a frequent contributor

to journalistic literature. He was professor of surgery in the medical department of the University of the South at Sewanee.

He had twice served as mayor of his native city and was a director of the schools and elder of the Presbyterian Church; a Knight Templar and a director in a number of banks and corporations.

He came from a distinguished family, noted for their literary attainments. He was a double second cousin of Miss Mary N. Murfree (Charles Egbert Craddock).

Dr. and Mrs. Murfree reared nine children, of whom two were physicians. One died early in his professional life and the younger Dr. M. B. Murfree survives him.

No man in his section was more beloved. For the first time in the history of Murfreesboro all of the business houses and public offices were closed for the funeral of one of its citizens.

Dr. Murfree was born in Murfreesboro, Tennessee, on September 16, 1835. He was the son of a prominent citizen, Matthias Brickell Murfree, and the grandson of Colonel Hardy Murfree, an officer of distinction in the Revolutionary War, in whose honor the town of Murfreesboro, then North Carolina, was named.

Dr. Murfree was a graduate of the old Union University, receiving the degree of Master of Arts. He then began his medical and surgical studies, attending lectures in the Medical Department of the University of Nashville. He subsequently went to Philadelphia and entered the Jefferson Medical College, where he received his degree as Doctor of Medicine in March, 1859. He began the practice of his profession in Murfreesboro, but it would seem that all his preparation was providentially designed for a great and immediate utility. The Civil War shortly broke out and he enlisted in the First Tennessee Regiment, Company I, and was at once detailed as medical officer to care for the sick. In 1861, he was commissioned assistant surgeon in the

Confederate Army and surgeon in 1862, holding this position to the close of the war, when he resumed his practice in his native town.

Thus he entered on that career of noble usefulness, blessing and blessed, which ended only when his spirit passed calmly forth from a world that has been enriched incalculably, in that he lived to grace it. With his talents and assiduity he early attained eminence in his profession. Despite the exactions of heavy practice he did much work gratuitously, his tender heart ever responsive to the cry of suffering. Like the Great Physician, his mission was to make less the sum of human wretchedness.

It is impossible to estimate the good wrought by this noble man in his untiring energy in the relief of human suffering. It is to be doubted if he himself realized it. Fifty-three years—more than half a century—toiling night and day, going to and fro, expending all, strength, science, ardor, time, life itself, in the service of stricken humanity, high and low alike, as alert to respond to the calls of charity patients as the rich in this world's goods. And when the hour came for his own martyrdom of suffering, he bore it like a stoic, a philosopher. Nay, for fortitude, he bore it like a soldier, unswerving in the discharge of a duty.

In addition to his peculiar fitness for his profession, Dr. Murfree's intellectual attainments were of a high order and his reading in belles-lettres was both extensive and varied. His wide information rendered his conversation delightful. He was of a cheerful, optimistic temperament, and had a genial sense of humor, with a glancing wit that often glittered, but never cut.

It would be difficult to over-estimate the hold that Dr. Murfree had on his community. The veneration, the deep affection, the admiration of his splendid traits of mind and character, the implicit reliance he inspired, all are tributes to demonstrate his worth. Even the children who adored him, even the poor and ignornant who felt that in him they

had an unfailing appeal—those who were too immature or too inexperienced to be capable of sounding the depths of his nature, knew by an instinct, shall we say by a revelation? —the saintlike goodness of the man.

And thus has passed an example of the old school physician with its traditions, courtesies, great heartedness, and with unstinted love of his community and with a singular devotion to those he served.

MAURICE HOWE RICHARDSON, M.D.

MAURICE HOWE RICHARDSON, M.D.
1851–1912

By S. J. Mixter, M.D.
Boston

Maurice Howe Richardson, M.D., one of the foremost surgeons of the United States, was found dead in his bed in Boston, July 31, aged sixty years. He was born in Athol, Massachusetts, December 31, 1851, the son of Nathan and Martha Ann (Barber) Richardson. He attended the public school of Athol and Fitchburg High School, and entered Harvard University in 1869, from which he graduated with the degree of A.B. in 1873. After a four-year course in Harvard Medical School he was graduated in 1877. During his last year in medical college, Dr. Richardson was assistant in anatomy under Dr. Oliver Wendell Holmes, occupying this position two years. He was then made demonstrator of anatomy and served until 1887, and thereafter was assistant professor of anatomy until 1892. From 1883 to 1887 he was assistant in surgery; in 1895 he was made assistant professor of clinical surgery; in 1902 associate professor of clinical surgery and from 1903 until his death was Mosely professor of clinical surgery.

He had been a member of the staff of the Massachusetts General Hospital since 1881, and was made surgeon-in-chief in 1910. Among his other hospital appointments were those of district physician and physician to the Boston Dispensary; surgeon to the out-patient department of the

Boston City Hospital and Carney Hospital, and physician to the House of the Good Samaritan.

His society membership included the American Medical Association; American Surgical Association, of which he was president in 1902; American Academy of Medicine; Southern Surgical and Gynecological Association, and Boylston Medical Society, of which he was once president.

Dr. Richardson was a prolific contributor to the literature of surgery and contributed sections to Park's *Surgery by American Authors* and Dennis' *System of Surgery*.

He was not only a great surgeon, but also a big warm-hearted man, lovable and beloved. As a teacher he made anatomy interesting and attractive, illustrating his lectures by crayon pictures, rapidly and artistically drawn. His knowledge of anatomy and his manual dexterity united to make him a great surgeon and he was one of the few who kept clinical records and kept them well so that they might benefit others. He had a strong sense of his responsibility to and for his patients, and while conscious of his skill, he used it soberly and without self-assertion.

Dr. Richardson's funeral was held at King's Chapel. The honorary pall-bearers included the president of Harvard University; Dr. H. P. Walcott, president of the Massachusetts General Hospital, and Drs. F. B. Harrington, S. J. Mixter, F. C. Shattuck, and W. F. Whitney, of the staff of the hospital; Dr. Frederick S. Dennis, New York City, and Dr. George Ben Johnston, Richmond, Virginia. The ushers at the church were former assistants of Dr. Richardson, and the acting pall-bearers were Drs. John Bapst Blake, Arthur H. Crosbie, F. E. Garland, Howard A. Lathrop, Charles G. Mixter, William J. Mixter, Edward H. Risley, and George M. Sheehan, all of whom had been closely associated with Dr. Richardson in his work.

We honor the memory of a friend, a friend whose genius, skill, and noble achievements have raised for him a monument more enduring and fitting than any could be fashioned

by us. His work was well and faithfully done—he leaves the world the better for his life, and while we mourn his loss, we glory in the great good that he was able to do for the relief of human suffering.

I first saw Maurice Howe Richardson when I entered the Harvard Medical School in 1875, when he was pointed out as the only man who had ever received the hundred mark in an anatomy examination. Splendidly developed in body and mind, he overcame difficulties with apparent ease that required severe effort of the average man. Living in the same house on Allen Street, near the Massachusetts General Hospital, our friendship began, and it remained warm and unbroken until his death.

He was already a wonderful dissecter, and spent as much time as he possibly could in the dissecting room, polishing up his anatomical knowledge, for he had made up his mind then to be a surgeon and a great one, and on one of the student days I remember his pointing to Bigelow as he was doing one of his beautifully executed operations and saying, "I mean to operate as well as that some day." In spite of his surgical aspirations, he worked hard at and was deeply interested in the different medical branches, becoming an expert in auscultation and percussion and a good diagnostician. It was this proficiency that gave him a place as student-assistant in the office of Dr. Henry P. Bowditch, whose confidence and affection he won, as he won those of everyone with whom he was associated.

Finishing his medical school career, he received the appointment of surgical house-pupil (interne) at the Massachusetts General Hospital, but after a short service, an assistant being needed in the anatomical department of the Harvard Medical School, he received the appointment on account of his anatomical knowledge and great skill as a dissecter, and served in that capacity under Drs. Porter and Beach until his appointment as demonstrator of anatomy in 1882. In those days the prosecting for the professor of

anatomy was done by the demonstrator and his assistants, and surely never were more artistic and instructive dissections used to illustrate the lectures.

In the dissecting room his wonderful anatomical memory and his great skill, not only with the knife, but in linking dry anatomical facts with the living problems in medicine and surgery, made the work there interesting to even the average student. Anatomical facts, without suitable pegs to hang them on, are soon mislaid and lost. He was always busy and the days were never long enough. He had his own living to make, and he helped out the income from his practice, which was a general one, with what surgery he could find to do, by private tutoring in anatomy.

Another work that he did thoroughly and well was that of district physician to the Boston Dispensary. In those days there were no district nurses, no "South Department" (contagious wards) at the City Hospital, and only a beginning of the Diet Kitchen. Diphtheria and scarlet fever, the infantile diseases of the summer, and the ever-present nursing bottle, with its dirty and deadly rubber tube, had to be fought in the homes of the poor. Tracheotomies had to be performed, watched and nursed as best might be by the physician himself and volunteer student assistants, a dangerous and laborious work.

It was a hard school, but every month was adding to his store of knowledge, and his general work in the Dispensary district was a great aid to him in after-life and did much to make him the great diagnostician he became. Could every surgeon have such a preliminary general service, and every internist a surgical service, the profession would be the better for it.

I always remember with pleasure the Sunday visits that, while still a student, it was my privilege to make with him and his ever-dear friend, who has so recently left us, the sterling man, the skilful surgeon, the public-spirited citizen—Arthur Tracy Cabot. During the week they would make out

a list of the most interesting and doubtful cases, and on Sunday go over them together.

All this time he was still teaching anatomy, and when he was promoted and no longer demonstrator, he kept on with a course in regional and surgical anatomy, which will always be remembered with pleasure by those whose privilege it was to attend it. His demonstrations were even more brilliant and instructive than those in the hospital amphitheatre, and the student certainly learned more from them, than from operations on the living. Often he would come in to the lecture room and say, "Tomorrow I do," or "this morning I did" such and such an operation. "Let us go over its anatomy"—and then would follow an hour of brilliant, exact, anatomical, surgical teaching, the important facts explained and emphasized by voice, crayon, and instrument, and with an enthusiasm that was contagious.

These details of his early professional life have been given to show that the foundation of his great surgical success was not mere luck or something that came to him without effort, but was hard work and constant practice. In the early days when he had an operation to perform that was not familiar to him, he would spend perhaps hours working on the cadaver, and when he operated later, one not familiar with his methods would wonder at his skill in a new field.

His appointment to the surgical services at the Carney and Massachusetts Hospitals, early gave him a chance to show his surgical worth. At the Massachusetts General he was for four years surgeon to out-patients and was appointed visiting surgeon on the same day as his friend Dr. Cabot. Here they worked side by side for years, adding to the fame of the institution they loved so well.

The history of abdominal surgery in this city almost, begins with the work of that bold and successful operator—Dr. John Homans. Dr. Richardson was one of his assistants for several years, and his training as an abdominal surgeon, may be said to have begun then. Large tumors of the ovary

and the uterus were the first lesions to be attacked, but as the field widened he was always to be found among the leaders in the fight against abdominal disease.

When the master mind of Fitz discovered the true meaning of inflammations of the appendix, Richardson was one of the first to apply the knowledge, and his early work in this direction won him just renown, and, had he done nothing else, his work and teachings in the treatment of appendicitis would have entitled him to the thanks of humanity—perhaps he looked back at this part of his work with more pride than at any other.

And so he went day after day, and year after year, always working, always teaching, always growing and advancing, until he had achieved the dream of his youth, and became one of the great surgeons of the country and the world; but his work never ceased, and his brain and his pen were busy when his hand was not. His superb physical force enabled him to do the work of several ordinary men, and he was operating in town and country to the very day of his death.

As an operator he had few equals, rapid, exact, and thorough—radical, but not rash; conservative, but never timid; only afraid of doing unnecessary or meddlesome surgery—a thing that he had a thorough contempt for.

But even great skill as an operator and exact anatomical knowledge do not make a man a great surgeon—there are operators and there are surgeons, and to be the latter, one must not only be skilful with the knife, but must possess what is equally important, sound surgical judgment. His keen and logical mind, his early training and his constant study of pathological processes in the living, gave to his opinion and diagnosis a value and weight that was unsurpassed.

His war on malignant disease was unceasing and unrelenting. Given a cancer, no operation was too severe or too radical, if it promised a cure, and the anatomical limit

was the only thing that satisfied him. With inadequate operation or meddlesome interference, with the *x*-ray, he had no patience. Early radical treatment in these cases, he taught both the profession and the public by his operations and his writings, and though he failed to cure in many cases, as every surgeon must who thinks not of himself, but of the patient, his percentage of cures was surprisingly large.

The list of his writings is a long one, and shows the wide field of his surgical activities. In his private work, other than operations on the appendix, the most frequent were tumors of the breast, those on the gall-bladder and ducts, and hysterectomies, both vaginal and abdominal. Tumors of the thyroid, including exophthalmic goitre, suprapubic prostatectomy, ureteral and kidney stone were among the things that greatly interested him. His distinguishing method of operating was rapid and careful dissection with a very sharp knife, a clear visual field during operation, and extreme care about hemostasis, tying and tying again to make doubly sure.

In his hospital work during the last years of his life, when he no longer had the routine work to do, he liked to choose for his own those cases where a diagnosis was difficult or the cases on the border-line of operable and inoperable. He was, thank heaven, a surgeon who never operated for statistics, and was as willing to report his failures and mistakes as his successes.

Consulting surgeon to a large number of the smaller hospitals in and out of our city, he was ever ready to respond to the call for help from the members of the profession, and, by his aid, his teaching, and example, has done more, perhaps, to raise the standard of surgical work in New England than any one man.

One great factor in his success was his singularly peaceful and happy home life—a fond and devoted husband, father,

and friend, he found his pleasure in his home when his professional work allowed him time for relaxation and rest.

He was spared the infirmities and the ills of old age and wasting disease, and though he left us in the full tide of his usefulness and success, and all too soon, should we wish it otherwise?

The Great Surgeon! And now The Man.—Those of us whose great privilege it was to know him best and to love him best, can scarcely put in mere cold words our feeling toward and of him. Honest and upright with others and with himself, a true friend; a hater of shams and poor workmanship, a help in time of need to any member of his profession who was in trouble; hospitable almost to a fault; a genial host; an ardent and true sportsman; why continue the list? Cabot sums it up, "Big of body, great of soul, strong of mind, and warm of heart." Can more be said?

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